The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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A Great Centenary

LOOKING back on a century of effort, progress and triumph, the United Alkali Company may be excused for a feeling of pride in the public celebrations of this success which have taken place this week. Whether one looks at it in detail or as a large collective enterprise, the restrospect is equally satisfactory. Great undertakings of this order usually have their rise in great characters, and for the first causes of the success of to-day we must look far back to James Muspratt, Charles Tennant, and others. These were born leaders of men, who regarded difficulties merely as things to be overcome. They have a double memorial in the work associated with their names and in the descendants who inherit their traditions and qualities. Apart from the *personnel*, the history of the British alkali industry illustrates the best sides of British enterprise. The application of science to the development of industry, the sound commercial organisation, the determined way in which difficulties arising out of new processes and changing conditions were surmounted one after another, and finally the unification of a whole industry under one control—all these are results the company itself can review with pride. But this is far more than a private commercial success; it is a national achievement, which enhances British credit throughout the world. And those who control the company's affairs have fortunately had the imagination to see its larger national meaning, and to make the centenary not only a domestic but a public occasion.

Not the least notable of the features of the centenary celebrations is the commemorative volume from which some extracts are published in this issue. In this the history of the British alkali industry is dealt with from various angles by competent writers, and a permanent record of great interest will be preserved. In the introductory article "F. W. B." presents a general picture of the main features of this "century of progress." The chief chemist to the company, Dr. J. T. Conroy, examines in detail the famous Leblanc process, adopted by James Muspratt in 1823, traces its commercial and technical developments up to its comparatively recent discontinuance, and supplies the appropriate epitaph: "It was born in war, it died in war, but its death was as glorious in achievement as its life." A character sketch of James Muspratt, written by his grandson, Horace Muspratt, recalls with very quickening effect the remarkable man who laid the foundations of the industry in this country. The origin of the United Alkali Co. itself—the formation of which in the autumn of 1890 meant the amalgamation of our Leblanc manufacturers and the gathering together of the strings into one knot—is told by one of the founders. From Mr. J. E. Davidson we have a sketch of the Tyne alkali industry, with glimpses of Charles Tennant and many who co-operated with him in its establishment. Some personal notes on the Tennant family, so closely associated with the alkali industry in its early stages, are contributed by Mr. T. W. Stuart, who over a period of forty-eight years has been in close contact with three generations of Tennants. Finally Mr. R. M. Bewick emphasises some of the imperial and foreign aspects of the alkali centenary. In days to come this volume will have an interest and value far beyond what it possesses to-day, and our thanks are due to those who have co-operated in its production.

Looking beyond the immediate relations of this week's celebrations, there are some aspects which have a wide and encouraging significance. For one thing, it disposes of the fiction, still popular in some quarters, that British manufacturers are incapable of collective "Team work" on a really large scale, or of adequate appreciation of the place of science in industry, or of a world organisation for sale and distribution. In all these things the alkali industry need not fear comparison with the best in the world. It is worth noting again that the foundations of the present success were laid by personal enterprise and initiative, without aid or control by the State, and that the industry has not been built up on any preferential basis. In a sentence, the industry has won its position simply on its merits, and that in the long run is the only basis on which an industry can survive.

Tanks for Transport of Acids

ONE of our Yorkshire readers has recently written to us in connection with the means employed for the transport in bulk of such substances as hydrochloric and nitric acids. Our correspondent is interested in this problem and is anxious to know of any experimental work in connection with it which has been carried out in this country, or to hear from manufacturers who have given particular attention to the matter. The bulk handling of acids is of fairly general interest to all industrial chemists, and opportunity may be taken of the present occasion to draw attention to the description which was given by Mr. F. C. Zeisberg at the meeting of the American Institute of Chemical Engineers last June, of a hard-rubber lined steel tank-wagon. In this case a laminated lining, consisting of a layer of soft and a layer of hard rubber was cemented to all interior surfaces, and was then vulcanised in position under considerable pressure. The outer layer of hard rubber thus comes in contact with the liquid to be handled, while the under layer of soft rubber (so firmly bonded to it and to the tank that it is practically impossible to pull it off) exerts a cushioning effect between the two harder layers. This cushion not only allows for differences in the rate of expansion of the two hard layers, but protects the inner lining in case the outer one is subjected to a blow. In the extreme event of the inner lining being broken as the result of an extraordinary shock, such as might be experienced in a train wreck, the soft-rubber backing would still hold, even if the tank were dented, allowing the acid to be drawn off at leisure without damage to the steel of the tank or car.

This tank, while designed primarily for hydrochloric acid, can be used with any other liquid which does not attack hard rubber, such as acetic acid, citric acid solution, caustics, etc. Moreover, because of the non-absorptive properties of the lining, a single tank can be used for a number of different materials, as it is very easily cleaned by simply flushing out with water. Some nine months after the tank was put into service it was found that it was in as good a condition as on the day it was installed; but from recent information concerning it which has appeared in our contemporary *Industrial and Engineering Chemistry* it would appear that some of the joints in the hard-rubber lining have opened up. There was, however, no sign of leakage, this being accounted for by the fact that the soft-rubber cushion next to the steel had remained intact.

Newspaper Press Fund Jubilee

IN connection with the Newspaper Press Fund, which celebrates its diamond jubilee this year, with the Prince of Wales as chairman at the annual dinner, on May 10, Sir Ernest Benn, at the request of the committee, has issued an appeal to his colleagues of the trade and technical press. This Fund, which was founded to do for newspaper men themselves what they have assisted so much in doing for other professions and causes, represents a common ground on which all classes of newspaper men meet, and its present membership is 3,300. In sixty years it has distributed £160,000 in grants and pensions. Last year it paid in grants and annuities no less than £11,580, an outlay far exceeding the regular income from interest on investments and members' subscriptions, and it is to the donation list and especially to the annual dinner that the Council looks to make good the deficiency and to strengthen the position of the Fund for the future. So many good causes are constantly being helped by the Press that public men in large numbers seize this annual opportunity of expressing their appreciation in the form of donations. Last year Lord Leverhulme was the president of the annual festival and raised a large amount. If any of our readers would care to join the very large and distinguished list of donors for this jubilee year their communications may be addressed to Sir Ernest Benn, care of THE CHEMICAL AGE, 8, Bouverie Street, E.C.

A "National Fuel" for France

SOME of our readers will recall that earlier in the year the employment of alcohol as a motor fuel was rendered compulsory by a Bill which was approved without discussion by the Chamber of Deputies. This Bill has now, it is learned, been passed through the Senate, so that France has set us an example in the way of promoting a "national fuel" which, as an experiment in legislation, will be watched with interest by countries similarly situated as regards means for obtaining liquid fuels. The production of alcohol in France from grain and beet is equivalent to about 10 per cent. of the amount of petrol imported, while an investigation of the efficacy of alcohol mixtures has shown that an excellent fuel is given by mixing petrol and alcohol in the proportion of nine parts of the former to one part of the latter. The State has, of course, a monopoly of the buying and selling of alcohol other than that required for human consumption, and the new legislation would appear to have been introduced primarily as a means for disposing of the very considerable stocks of alcohol which have accumulated. Importers of all liquid fuels, such as petrol and benzol, are required to purchase from the State such a quantity of alcohol as shall be sufficient to enable them to market a 10 per cent. mixture; but the State retains the right to modify the percentage according to circumstances, and also to fix the price. That is to say, as research is pursued, the conditions may from time to time be altered so as to keep pace with the latest technical developments.

The position with regard to alcohol distilled from fruit and grapes does not seem to be quite clear at the moment, but it is understood that the Senate has approved the use of the country's surplus wine for transformation into power alcohol by admixture with petrol. If this proposal is carried into effect it is likely to render France very much less dependent upon imported fuels, and also to render one of her chief national industries less liable to disturbance by trade fluctuations. In this country the production of a sufficiency of indigenous spirit is recognised as one of the leading technical problems of the day, but it is an elusive matter, for we are not so fortunately situated as is France. There is every hope, however, that with the progress of science the problem may be unravelled, possibly on some such lines as were discussed by Mr. Rex Furness in the articles which he contributed to our issues of March 17 and 24.

Mr. Furness suggested that the production of any desired amounts of ethyl alcohol for power purposes is possible in England without any disturbing effects in other directions if electrical power is made available at a low cost, say, 0·1d. per unit. The possibility is not remote if we may take the assurances of the hydro-electric experts; and various schemes have been advanced which promise success, despite the fact that we possess in this country very little water power as ordinarily defined.

Budget Benefits

ALTHOUGH many complaints have already been expressed that the Budget, introduced this week, does not go far enough in relieving the burdens on taxpayers and on business concerns, its concessions are nevertheless welcome and in many cases substantial. Income-tax is reduced from 5s. to 4s. 6d., and the Corporation Profits Tax from 1s. to 6d. Beer will be cheaper by £1 a barrel, cider will be free from the duty of 4d. per gallon, and sweetened table waters will pay a tax of 2d. per gallon instead of 4d. The reduced postal rates are 1½d. for 2 oz. and ½d. for every additional 2 oz. for inland letters; 1½d. for 1 oz. and 1d. for every additional ounce for letters to Dominions and U.S.A.; 2½d. for 1 oz. for foreign letters; ½d. for 2 oz. for inland printed papers; and a general reduction of 3d. on the existing rates for inland parcels. The rental for ordinary telephone installations is reduced by 10s. and local call office message fees from 3d. to 2d.

These concessions, taken together, constitute a considerable relief to the private taxpayer and the business man, though many leaders of industry like Sir Alfred Mond still feel that the reduction and stabilisation of taxation should receive more consideration even if immediate debt reduction received less. The reduction in Income Tax is progressive, and supplies, in addition to present relief, a prospect of regular further concessions as time goes on. The halving of the Corporation Profits Tax is welcome for its own sake and also because it may safely be regarded as a prelude to the complete abolition of this obnoxious impost on business enterprise next year. When the tax was first introduced, our readers may remember, its harmful effects were emphatically pointed out in these columns and an insistent demand has been kept up for its abolition. It is a satisfaction to have been able to take so effective a part in relieving business concerns of half of this burden and in making complete relief practically certain in next year's Budget.

The Corrosion of Metals

THE joint conference of the Faraday Society, the Sheffield Section of the Institute of Metallurgy and the Manchester Metallurgical Society held at Sheffield, last week, is of interest, not only in being a co-operation between a "pure" scientific society and two practical industrial societies, but because of the important problem that was under discussion. The corrosion of metals in air or under the influence of acid fumes is one of those everyday phenomena which are often accepted but not investigated, and any definite knowledge of the conditions or causes of corrosion is of great value to the whole community, but especially to those connected with chemical engineering. It would obviously be of great advantage to chemical manufacturers if they could be reasonably certain that the structure of their sheds and the exterior of their pipes would not crumble to pieces under the influence of fumes any more than the special acid-resisting plant actually dealing with corrosive liquids would not break down. The present discussion on the corroding influence of gases on metals and alloys is therefore to be welcomed as a serious effort to attack problems of high scientific interest as well as of great commercial importance.

Points from Our News Pages

Mr. A. R. Tankard concludes his discussion on "The Influence of Science on Human Life" (p. 418).

A review is given of the growth of the British Alkali industry during the past century (p. 421).

The corrosion of stainless steel and iron was the subject of a paper at the joint conference on corrosion problems held at Sheffield University last week (p. 425).

A demonstration of an improved steam waggon, known as the "Super-Sentinel," was given last week at the Sentinel Waggon Works, Shrewsbury (p. 427).

According to our London Market Report trade has been fairly satisfactory during the past week, and there has been a tendency towards increased prices in some cases (p. 435).

A quiet tone continued to be maintained in the Scottish chemical market (p. 438).

Books Received

METALS AND METALLIC COMPOUNDS. 2 Vols. By Ulick R. Evans. London: Edward Arnold. Pp. 468 and 395. 21s. and 18s.

The Calendar

April		
23	The Faraday Society. "The Properties of Powders." 8 p.m.	Burlington House, London, W.1.
23	Royal Society of Arts: Cantor Lecture. "Nitrates from Air."—III. E. Kilburn Scott. 8 p.m.	John St., Adelphi, London.
24	Hull Chemical and Engineering Society: Annual General Meeting. 7.30 p.m.	Hull Photographic Society's Rooms, Grey St., Hull.
26	The Society of Dyers and Colourists (London Section): "Fur Dyeing." L. G. Lawrie. 7 p.m.	The Dyers' Hall, Dowgate Hill, London, E.C.
26	The Royal Society: Papers by W. A. Bone, D. M. Newitt, D. T. A. Townend, T. R. Merton, R. C. Johnson and others. 4.30 p.m.	Burlington House, Piccadilly, London, W.1.
27	Royal Institution of Gt. Britain: "Measurement of the Heating Value of Gas." C. V. Boys. 9 p.m.	Albemarle Street, Piccadilly, London, W.1.
27	Society of Chemical Industry (Liverpool Section): Annual General Meeting. "The Determination of Sulphur," J. M. Taylor. 6 p.m.	The University, Liverpool.
27	Institute of Chemistry (Belfast Section): "Atoms and Electrons." 7.30 p.m.	Queen's University, Belfast.

The Influence of Science on Human Life.—II.

By Arnold Rowsby Tankard, F.I.C.

(*Public Analyst to the City of Hull.*)

THE researches and discoveries in connection with the upbuild of the elements show that it is hydrogen, in all probability, which is the " proton " or ultimate constituent of which these are composed, and by some method the different elements have been evolved from this unit. Of what, then, is hydrogen composed ? We are here on much more controversial ground, but we seem to be drawing near to the day which, when it has dawned, may show us that matter is only a manifestation of electrical energy. But our present knowledge is so far lacking that it is difficult to visualise what is meant by such a statement.

If, then, we have adequate grounds for believing that the inorganic elements as we know them are, by a process of evolution, the survivors of the more stable forms, and if we accept the theory of organic evolution as propounded by Darwin and Wallace, modified and augmented by later workers, we must surely go a little further and adopt the view that this organic evolution is but a step in the grand march of evolutionary change. All the evidence of recent years points to the conclusion that even if such a change is not now going on, there was at some period of our earth's history a set of conditions of temperature and moisture particularly favourable to a change of inorganic material into living organic substance. Indeed, the supposition that this change occurred only in the past has little to support it. The renaissance of the idea of evolution by the acceptance of the work of Darwin and his followers has had, perhaps, more influence on human life than can be traced to any other isolated generalisation of science. Evolution in some form or other is seen to be a universal law of nature ; it includes in its ambit solar systems, the so-called elements, the plants, and—amongst living, sentient beings—the races of animals and man.

Science is ubiquitous, and everywhere extends her borders. Investigators in biology and allied sciences have applied themselves to the questions raised by the complex upbuild of living matter, as have chemists and physicists to that of inorganic material. The nature and structure of protoplasm, the chief constituent of the living cell, and " the physical basis of life," as Huxley termed it, are being worked out successfully, and much knowledge has been gained. Scientific workers have studied the physiological action of foods and their constituents on the cell and its protoplasm, while agricultural chemists have gained much knowledge of the properties of the soil and growing crops ; so there has arisen a science of agriculture more ably directed than the rule-of-thumb agriculture of our grandfathers, based on a knowledge of the constituents of foods and their action in the body. The comparatively recent discovery of " vitamins," those " activators " of the food-material so essential to our growth and complete health, shows that probably much more yet remains to be done before we can have any surety that we know what is to be known on these matters. We have learnt much of what happens when we eat certain foods, and how these foods yield nutritive components for use in the body. We are learning how the plant makes its material, used by animals for food, from the nitrogen, phosphorus, and potash which, with water and carbon dioxide, are contained in the soil and air. We have some inkling of why certain foods are superlatively good, some poor, and some perhaps relatively useless, though all may contain considerable amounts of fat, proteins, and other nutritive constituents.

The Rôle of Bacteriology

While the food of man and animals has received much attention from science in its various branches, their ailments and diseases have also been the subject of much study, and in the young science of bacteriology we have a helper which has good work to its credit. Many diseases due to micro-organic infections are now not nearly so much dreaded by the medical practitioner, who has had put into his hands a valuable weapon by which he can help the body to fight the alien invader. Valuable improvements in the construction of the microscope have enabled rapid progress to be made, and the ultra-microscope has added another refinement which is yielding results of importance in many directions. The theory underlying vaccination against smallpox is now more clearly understood, and bacteriology also enables us to guard the people's food from contamination in those cases where injurious bacterial infection can be traced. In medicine and surgery the stethoscope, the anæsthetic, and antiseptic and aseptic methods, have all given help of great value to suffering humanity.

In the realm of physics and engineering, electricity has come into its own, and it now lights our buildings, drives our machinery, and enables us to speak to distant places, annihilating distance. Waterfalls like Niagara, and many of smaller dimensions, are potential reservoirs of electric power, which will come more and more into use as the generations pass. Telegraphy, wireless telegraphy and telephony take up the chorus of scientific praise to a field of human endeavour which promises to be indispensable in every department of civilised life. What shall we say more of the science of engineering ? Without it no twentieth century civilisation, as we know it, could have arrived ! Our huge modern buildings with all the new materials used in their construction ; our bridges, our roads, our locomotives and trains ; our systems of underground railways, and coal mines ; the internal combustion engine, and the motor vehicle ; our steamships and airships, our aeroplanes, and many more marvels of the modern age of engineering—who can picture our life without these great achievements ? Of the science of psychology and the wonderful revival of interest and research in this branch of knowledge, due largely to the war, one scarcely dare speak. The workers with real knowledge in this field are rare, and the number of those who can follow them in their flights of fancy or otherwise are very few more ! But it is certain that from this field of the science of the mind much fruitful work will eventually emerge and become part of our everyday knowledge, adding greatly to our health and general well-being, and enabling many distressed persons to come back to a more normal life, free from the stigma necessarily attaching to our mental hospitals.

The Romance of Science

What, then, are we to say as to the effect of all this accumulation of knowledge, endeavour, and achievement in science ? First and foremost, science for its own sake, as abstract knowledge, is of the highest possible value, apart from any potential usefulness it may have. " Science possesses a cultural value independent of the utility of its applications," as has been well said.* The aim of science is the discovery of truth, and by its disinterestedness it should command public confidence. Moreover, as another writer puts it, " only science can extend the soul's empire over soulless things, and compel matter to fall into subjection to the human mind. . . . Science is always abolishing bogeys, and laying the ghosts which circumscribe our spiritual freedom."

By scientific discovery, and by reading of the discoveries of workers in other fields than our own, man's interest is aroused. This life, many of us feel, with its disappointments and struggles, its losses and its fluctuations between good and bad times, would be an undesirable thing were it not for such interests as science, for example, can provide. Seneca said : " The world is a poor affair if it does not contain matter for investigation for men in every age. We imagine that we are initiated into the mysteries of Nature : but we are still hanging about her outer courts." It is this belief that gives us hope in going on, ever experimenting, urging our minds as with a goad towards the ultimate truth that shines in the distance, though it may ever be beyond our grasp. Thus comes about that splendid heroic rivalry amongst scientific workers to excel in the extension of the sum of human knowledge. This is the true romance of science. There is poetry in it ! Who can remain unmoved by the story of the discovery of helium in the sun and a generation later on the earth, or

* Sir R. Gregory : *The Message of Science* (1921 ; British Association Addresses).

in reading of the Darwinian conception of organic evolution, or of the nature of the ultimate constitution of the atom? Even to numbers of those who follow science only from a distance these things give intellectual uplift and joy immeasurable. When we come to the applications of science, and consider their relation to our material welfare, we can see how they add to our comfort and health, and their influence is assuredly great and beneficial to humanity. In this twentieth century we have a period in our history when the exact scientific knowledge of a hundred years is concentrated and in practical use everywhere by man. What is the effect of this accumulation of practical science on our race? The earth is made a small place. Distance, we may repeat, is annihilated—and the nations of the world, for long strangers and thus distrustful of, and antagonistic to, one another, are brought into more intimate contact. The day is not far distant when people will speak to one another across continents by means of wireless telephony; when our airships and aeroplanes will still further contract this little world, and distant countries will be in actuality closer to us than London was to Edinburgh in our grandfathers' days. Jules Verne's dream of "Round the World in Eighty Days" is already laughable in its antiquity! Because of these things, it is the hope of all men and women of goodwill that there will some day be a better understanding amongst the peoples of the world. Scientists are not crude materialists and enemies of mankind. No body of men without "vision" could have accumulated the knowledge of which we have here caught a passing glimpse. Had there not been in this age scientific men with broad, receptive outlook—men capable of high thinking, free from the trammels of despotism and authority in high places, no Einstein could have emerged to show us that Newton's laws of gravitation and of the propagation of light were not immutable nor accurate in detail, but only relatively true at a given time in given conditions of space. How can the critics of science continue to say that scientific workers are mere machines for grinding out facts and formulating laws, when we remember the sublime discoveries of our modern astronomers? What have these critics to answer when we tell them of the great value to suffering humanity of the science of bacteriology, and of the glories of anæthesia and of aseptic surgery? How can they reply to the grand conception of the origin of the races of mankind, as set forth by the work of Darwin and his successors, if they assert that little good ever came from scientific research and investigation?

Science as Viewed by the Arts

Let the reader call to mind the noble words of Darwin himself, written in concluding his *Descent of Man*. They speak for themselves of the ennobling influence of scie ce! And while we have such men, who give their lives to the s y of man and his world, we do well to cherish the hope and beuef that science will continue to flourish. Detractors of science imagine it as causing an atrophy of all that is best in human nature. But an unsympathetic attitude warps the judgment of men; and it is surely more true to say that by setting aside peremptorily every superstition and error that will interfere with her single search for the truth, as far as man can attain it, science proclaims her pre-eminently altruistic aim and purpose.

And even now, in spite of unfriendly critics, science is slowly coming into its own. THE CHEMICAL AGE recently quoted a warm tribute to workers in science from the lips of Dean Inge. The recently-published *The Torch-Bearers* of Alfred Noyes is a finely enthusiastic appreciation of the discoveries of the pioneer astronomers, and is the first volume of a projected "trilogy" which all scientific workers and those interested in modern scientific discovery will do well to read. The poet makes Newton utter these remarkable words, which breathe the true scientific spirit:—

"... What is all science, then,
But pure religion, seeking everywhere
The true commandments, and through many forms
The eternal power that binds all worlds in one?
It is man's age-long struggle to draw near
His Maker, learn His thoughts, discern His law—
A boundless task, in whose infinitude,
As in the unfolding light and law of love,
Abides our hope, and our eternal joy."

We scientific workers, then, are a part of that large army which has done great service for humanity; and we are helped by being reminded of it. In all sincerity the writer, in conclusion, gives the reader the sublime toast: "To Science! and Long may she Reign!"

The Nitrogen Industry in France

To the Editor of THE CHEMICAL AGE.

SIR,—In your issue of March 17 you have pointed out the position of the nitrogen industry in France with references to my article from *Chemistry and Industry* of March 9. I think that the facts which are to be considered are the actual production of 19,000 metric tons of nitrogen in France against a consumption of 110,000 metric tons—that is to say, a deficit of 91,000 metric tons of nitrogen. From this point, it is evident that the technical problem is greatly influenced by political and economical considerations, for the reason that the users of nitrogen fertilisers (especially ammonium sulphate) and their representatives to the Chamber of Deputies and to the Senate want to have cheap fertilisers and enough for the consumption of agriculture without being dependent on other countries. They examine afterwards the problem from its technical point of view, wanting, however, a large commercial competition between all the processes. It must also be considered that the actual French deficit is a minimum, and that it will increase with the development of scientific methods in agriculture.—I am, etc.,

MAURICE DESCHIENS.

Romainville, April 16.

Peachey Leather Products

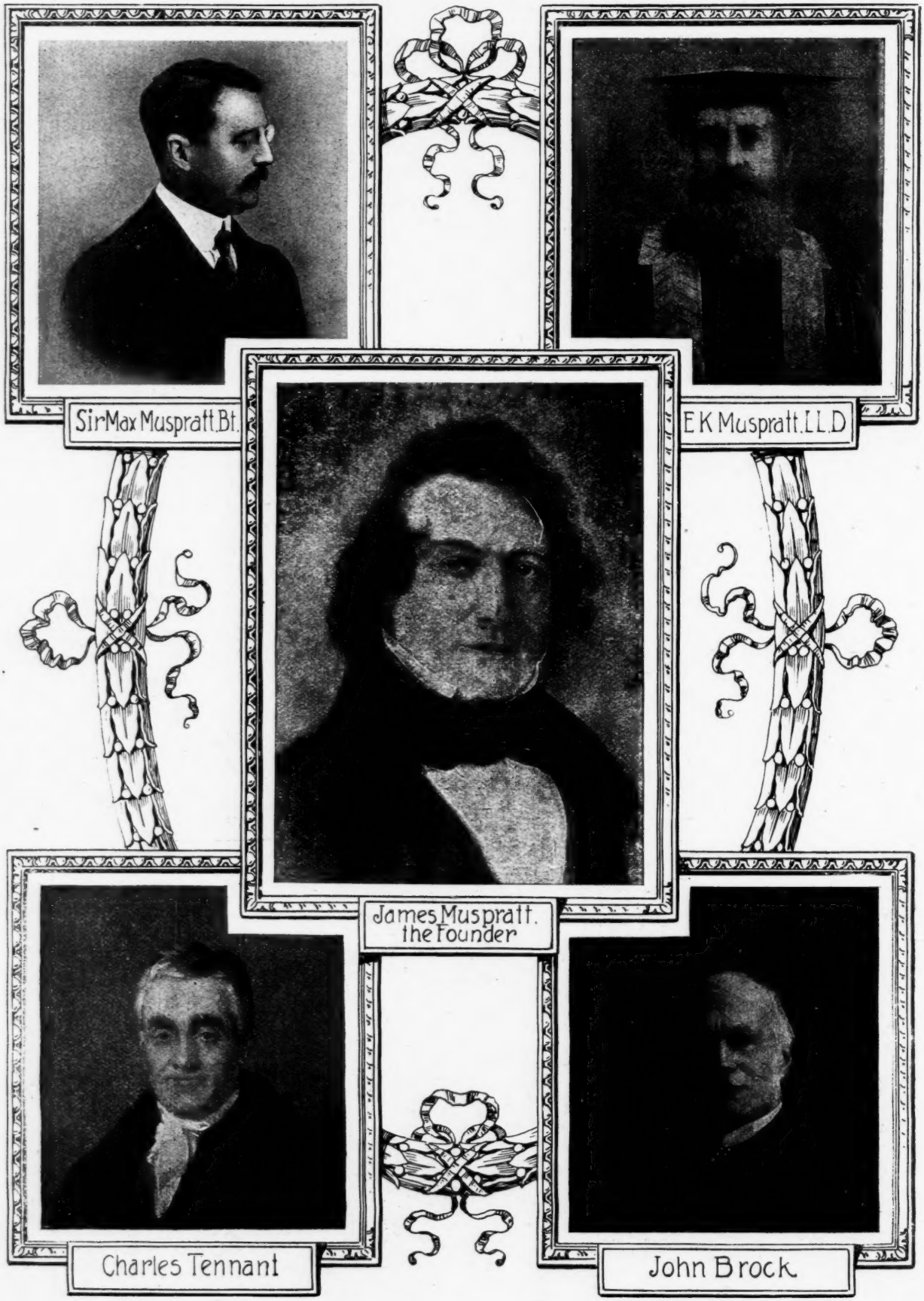
PEACHEY LEATHER PRODUCTS, LTD., has been registered as a public company, with a nominal capital of £150,000 in £1 shares. The objects are: To acquire an exclusive license to use and exercise in the United Kingdom the Peachey process for the cold vulcanisation of rubber as applied to leather and leather waste; to manufacture and deal in all kinds of leather and other goods, household furniture and fittings and other articles of personal and household use, and to carry on the business of boot and shoe manufacturers and dealers, leather merchants and manufacturers and dealers, leather dressers, etc. The minimum cash subscription is seven shares. The first directors are: Right Hon. Lord Gainford, P.C., Right Hon. Lord Daryngton, P.C., M.P., C. S. Baring Gould, C. A. Bolton, B. E. Cammell, and J. W. Anderson, 16, St. Helens Place, E.C.3. Qualification, £100 ordinary shares. Remuneration, £250 each per annum (chairman £600) and a percentage of the profits. The registered office is at 16, St. Helens Place, E.C.3.

A New Commercial Refractory

ELECTRICALLY sintered magnesite, a material having the highest melting point of any commercial refractory is reported from the U.S.A. as now being produced in quantity by the Carborundum Co. It is made from carefully selected California magnesite and is thoroughly fused in an electric furnace. It contains about 95 per cent. MgO and less than 1 per cent. of iron oxide, and has a melting point of about 2,600 deg. C. The material is especially resistant at high temperatures to iron or iron oxide. This makes it most valuable for lining metallurgical furnaces, either in the form of bricks or in granular form, tamped in. A further unusual feature of electrically sintered magnesite is that it does not contract when subjected to conditions encountered in industrial installations.

What a Reader Thinks

A NORTHERN subscriber writes: "I have received your *Chemical Age Year Book*, and note with some surprise that such a valuable book should be free even to subscribers. I consider that THE CHEMICAL AGE holds a position few technical papers can assail: that is in being really useful—in fact, invaluable—to the trade it caters for. Immediately I am settled down I shall order direct from yourselves."


Sir Max Muspratt Bt.
E K Muspratt. L.L.D
James Muspratt.
the Founder
Charles Tennant
John Brock

Centenary of the British Alkali Industry

A Review of Scientific and Industrial Progress

THIS week the United Alkali Co., Ltd., are organising celebrations in connection with the centenary of the British Alkali industry. On Wednesday evening a centenary dinner was held at the Adelphi Hotel, Liverpool, and inspections of the company's various works have taken place daily. The company, recognising the national aspects of the occasion, have treated it as far more than a domestic event, and have prepared a comprehensive history of the industry which will be an addition to every chemical library. This beautifully printed and illustrated volume contains a group of unusually interesting articles: "A Century of Progress," by F. W. B.; "Le Blanc and After," by J. T. Conway, B.Sc., Ph.D., chief chemist; "Personal Notes on James Muspratt, 1793-1886," by his grandson, Horace Muspratt, a vivid and picturesque character study; "The origin of the United Alkali Company" by One of the Founders; "The Tyne Alkali Industry," by J. E. Davidson; "The Tennant Family," by T. W. Stuart; and "The Alkali Centenary: its world significance,' by R. M Bewick. It would be impossible to do justice to this miscellany of contributions without quoting them, but some idea of their range and quality is indicated in the following extracts:—

A Century of Progress

The year 1823 (writes F. W. B.) saw the establishment of the alkali industry in this country. The founder was James Muspratt, who, with great boldness and sagacity, seized the opportunity afforded by the repeal of the Salt Tax to exploit the chemical process invented by the French scientist, Nicolas Le Blanc. The inventor himself died, poverty-stricken and broken-hearted, submerged in the social chaos of revolutionary France. James Muspratt established the process in Liverpool as a manufacturing venture; made for himself a fortune, and added to his country's credit the invaluable asset of its heavy chemical industry.

In 1923 the Le Blanc process was completely discarded, but the industry which was built upon it remains, still advancing, developing in ever new directions, demanding still of those concerned in it the same qualities, judgment, audacity, and untiring labour demanded of the Muspratts, Gossages, Tennants, Gaskells and Deacons a hundred years ago, but invoking still more urgently the devoted and unwearying search for the fundamental truths of science.

The property of the company at its inception in 1890 consisted of forty-eight works—of which forty-five were chemical works and three salt works. Forty-two of the works were in England, four in Scotland, and one each in Ireland and Wales. The company controlled, moreover, the Le Blanc departments of five other works and had working agreements with several others, manufacturing similar chemicals. Sir Charles Tennant, Bt., held the position of honorary president of the company until his death in 1900. The first chairman was Mr. John Brock, formerly of the firm of Messrs. Sullivan and Co., Ltd., Widnes. In 1913, he retired and was succeeded by the present chairman, Sir Max Muspratt, Bt., whose father, Dr. E. K Muspratt, son of the founder of the industry, was one of the original directors and is now honorary president of the company. Of the original directors, besides Dr. E. K. Muspratt, the president, there remain Mr. John E. Davidson, Newcastle-on-Tyne, of The Newcastle Chemical Works Co., Ltd., Mr. John A. E. Rayner, of the firm of Messrs. A. G. Kurtz and Co., St. Helens; and Mr. James Tennant, of the firm of Messrs. Charles Tennant and Partners, Ltd., Lt.-Col. J. B. Gaskell, of the firm of Messrs. Gaskell, Deacon and Co., resigned from the Board only last year. He was succeeded by his nephew, Mr. Holbrook Gaskell—the third of the name, in direct succession actively engaged in the conduct of the company.

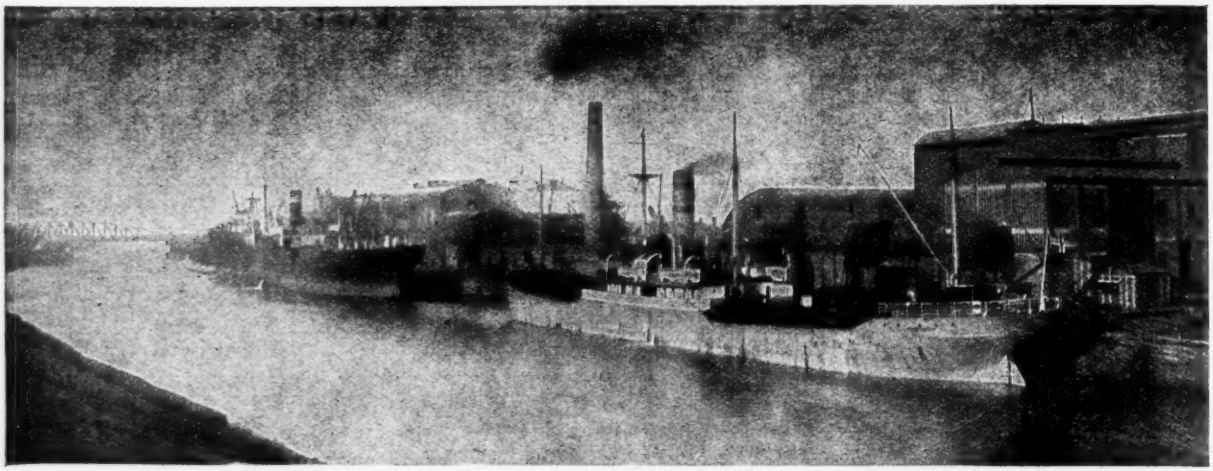
Of the great names associated with the alkali industry in the days of its infancy, there are still some direct representatives concerned in the control of the Alkali Company. There are on the board to-day two Muspratts, grandsons of the founder, a Gaskell and a Tennant, while Mr. Henry Wade Deacon is one of the trustees for the debenture holders. Almost from the beginning the company had to face new and changed conditions of trade throughout the world; indeed, during its whole history it has been experiencing a slow and sometimes painful process of metamorphosis; for in scientific industry there is no completion, no finality. The Alkali Company realised this from the beginning, and no side of its work received such attention as did research. As years went by, ever increasing importance was attached to scientific investigation, and the sure foresight, consistently displayed, requires no more signal proof than that the company, founded thirty-three years ago on the basis of the Le Blanc process, still retains the bulk of the heavy chemical trade of the country, manufactured by methods probably the most advanced in the world. To-day the operations of the company cover, furthermore, a great part of the wide field of fine chemical and dye-intermediate manufacture. Throughout its history the company has sought to secure and retain in its own hands the control of essential raw materials. The purchase of pyrites mines in Spain and the development and extension of salt and limestone properties instanced this. The same bold policy characterised the building of works in the United States to overcome the difficulties created by the American tariff war, the growth of the company's fleet of coasting steamships, and the development of the fertiliser trade in this country. Readiness to meet exacting new conditions with sureness and speed, a tradition bequeathed by the founders, was conspicuously shown in the magnificent response made by the company to the grave emergency of the Great War.

"Leblanc and After"

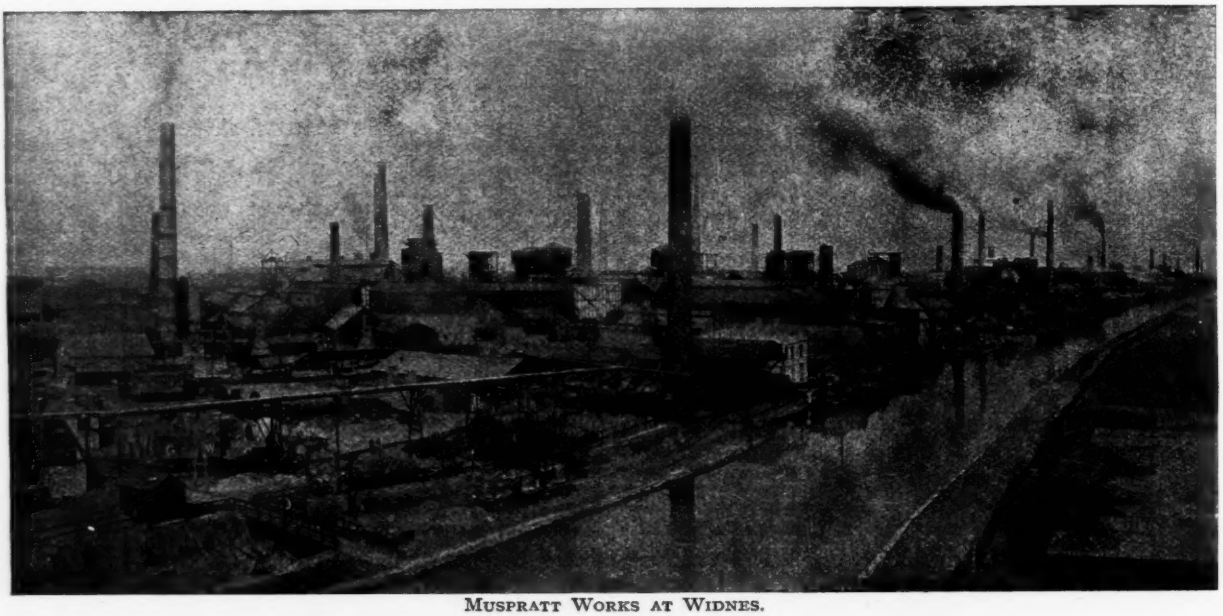
The development of industry during the century forms the subject of an informing chapter by Mr. J. T. Conroy, the chief chemist, who points out that the Leblanc process was devised solely as a means of making alkali from available raw material, the wars of the late eighteenth century having made it impossible for France to obtain her supplies of "barilla"—the alkaline ash left on burning seaweed. Leblanc turned his attention to salt, and found that the product obtained by heating salt and vitriol would give, on furnacing with limestone and fuel, a material yielding an alkali solution on lixiviation with water. From this solution the alkali was later obtained in solid form by evaporation. Such was the process introduced into this country. The nuisance to the community created by the escape of the chlorine in the salt as hydrochloric acid vapour into the atmosphere was extreme, but was ultimately overcome by Gossage, of Widnes, who designed the coke-packed absorption tower in use to-day. Other packings have replaced coke in certain instances, but the design remains unchanged to-day. The acid so recovered finds extended use in industry—in galvanising, gelatine making, dyestuffs, etc.

Mr. Conroy outlines the many processes which have been successfully carried out by which both the sodium and chlorine of the salt have been satisfactorily utilised in the production of sale products, and points our that the loss of manganese in the original chlorine operation, and the loss of chlorine in the Weldon process have been overcome, and that the only serious loss of raw material rests in the sulphur entering the vitriol used in decomposing the salt. Many attempts, he adds, had been made to recover this sulphur, and of those which failed to mature the most promising was due to Mond, and was tried by him in several works before he directed his life's work to ammonia soda. The one successful method was finally worked out by Chance, of Oldbury. It consisted in forcing lime kiln gas through a slurry of vat waste in a series of carbonating vessels, and so manipulating pressures and valves that the sulphuretted hydrogen liberated left the plant in concentrated form. This strong gas admixed with the requisite air passed over a suitable contact mass in the Claus Kiln (a plant designed for sulphur recovery in coal gas purification) is oxidised to water and elemental sulphur. This may fitly be described as the crowning achievement of the series of operations involved in the decomposition of salt on the lines originated by Leblanc.

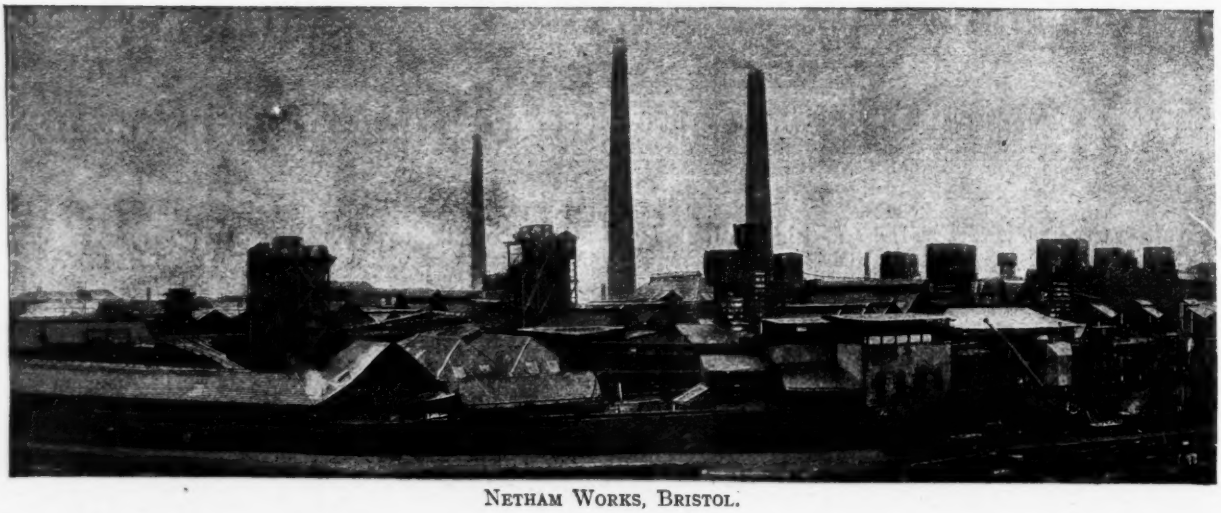
After noting other "landmarks of progress," Mr. Conroy remarks: "With the possible exception of certain of the larger metal industries the majority of the general chemical industries are dependent on alkali and its allied products. From caustic soda is obtained the metal sodium, a raw material for the manufacture of cyanide, to the solvent action of which we owe much



WIGG FERTILISER AND METALLURGICAL WORKS ON MANCHESTER SHIP CANAL.



MUSPRATT WORKS AT WIDNES.



NETHAM WORKS, BRISTOL.

of the gold won to-day. To sodium we also owe the early preparation of aluminium, and, though the older methods of chemical reaction have yielded place to newer types, alkali still plays a big part in the early treatment of the mineral raw material. Their debt to the alkali industry will also be readily conceded by those engaged in the manufacture of tungsten, vanadium, etc. Alkali and its associated products play a prominent part in all present-day activities, perhaps more essentially in one the importance of which was not recognised sufficiently early in this country. I refer to organic chemistry, and more particularly to the dye industry. The United Alkali Co., Ltd., soon after its formation recognised the importance of this outlet for the old-time products and did much pioneer work to make a beginning in this country. They were handicapped by patent laws, by Excise regulations, and other causes, and it was not until August, 1914, that the importance of the earlier efforts received recognition. "During their first decade they established the manufacture of acetic acid and acetone, following with chloroform and formic acid. In the same period work was carried out on benzol and the chlorbenzol and nitro-chlor-benzol derivatives were placed on the market. Prior to 1914 the bulk of these had to be sold abroad against German competition—during the war there was a large home demand mainly for war purposes. War demands led to further developments and the production of increasingly complex products. The latter have been manufactured successfully and the majority have their uses in times of peace. Such use should now be made at home—it is the country's duty to work up its own intermediate products to the final market forms and find employment for its own people."

A Sketch of the Founder

In some personal notes on James Muspratt, the founder, Mr. Horace Muspratt gives the following delightful picture: "The room is large and airy. Through the windows may be seen the Mersey estuary, the Wirral and the distant Welsh hills. Just beyond the fireplace stands a high screen of Chinese workmanship, whereon weird dragons and other curious beasts seem trying to catch the coolies, who are carrying packages over a bamboo bridge. In front of this is an old-fashioned armchair, upholstered in leather. On the chair sits an old man, with a face which arrests by its strength. The deepness of the brow is enhanced by the receding hair. The mouth is firm, and the expression is one of decision, without sternness. A single eyeglass dangles over the waistcoat, but it is only used for reading, the sight still being good. On a table at his side lies the *Times*, now finished with for the day. Such is the picture that remains in my mind of the times when, as a little boy, I was ushered into the presence of my grandfather. Nor does the picture undergo much change until the last time I saw him in the same room, but a short time before his death."

James Muspratt was a remarkable man, strong in physique, intellect, and character. Of English descent, he was born in Ireland in 1793, and was apprenticed at 14 years of age to a forerunner of the five chemical manufacturers. Losing his father and mother while still under age, he went off to Spain to engage in the struggle against France. His intention was to join the cavalry, but the authorities decided otherwise, and, becoming tired of campaigning on foot, he got a berth in the Navy as midshipman, in which capacity he served until the conclusion of the war. So harsh was the discipline that he and another junior officer deserted one dark night at Swansea, and, after narrow escapes from capture, first by a search party and later by a press-gang, reached Dublin in safety. There he entered in a small way upon chemical manufacture, married at 25, and four years later, in 1822, moved to Liverpool and established a sulphuric acid plant. In 1823 the salt tax was repealed, and the young manufacturer promptly seized the opportunity to install a further plant to work the Leblanc process. This proved a paying proposition, and after enlarging his works to their fullest capacity he erected an additional works at Newton, and later moved to Widnes, other works being subsequently established at Flint. He attained the great age of 92 and retained his remarkable powers to the end.

The Origin of the United Alkali Co.

One of the founders reviews the conditions which led to the establishment of the United Alkali Co., Ltd., on November 1, 1890, and adds: "The number of works included at first by actual purchase was 43, whilst agreements of a 'dead renting' nature for a long period were made with another five. Within six months of the registration of the new company, three important works, which at first had declined to join in the amalgamation, were acquired; their representatives joined the board of the new company, and thus the amalgamation of practically all the British Leblanc manufacturers in the United Alkali Co., Ltd., was effected. Since that day many economies through improvement and change of processes have been effected, concentration of manufacture at fewer centres has been steadily pursued, the company has erected its own installation for the production of ammonia soda, the electrolytic process has been adopted for the manufacture of the chlorine products, and the good old Leblanc process, the foundation of the alkali trade, so interesting to work with all its by-paths, and so profitable to the older generation, has been definitely discarded."

The Tyne Alkali Industry

About the year 1796, Mr. J. E. Davidson writes, Mr. Wm. Losh made the first efforts towards the manufacture of alkali at Walker-on-Tyne. The industry gradually attracted the attention of others, the erection of further works followed, until finally in the year 1880 a maximum production was attained—the number of works in that year being at least upwards of twenty, and the decomposition of salt 200,000 tons per annum, or thereabouts. Amongst the captains of this industry may be mentioned the following men, all of whom have now passed away: Sir Charles Tennant, Bt., Mr. Christian Allhusen, Mr. J. C. Stevenson, Mr. John Williamson, Mr. Hugh Lee Pattinson, Mr. Robert C. Clapham, Mr. John Glover, Mr. Jacob Burnett, and Professor Lunge.

The operations carried on were restricted to the classic Leblanc process, which, having been worked for close upon one hundred years, became finally extinct in the United Kingdom in 1920. The last revolver in existence under this process was operated, and finally demolished at the Gateshead works. From 1880 the satisfactory financial results of this industry on the Tyne gradually deteriorated so that year by year the smaller works were forced to close until, in the present year of 1923, only two works for the production of heavy chemicals continue in operation on the Tyne, the one at Hebburn and the other at Gateshead. The former was maintained in operation by the courage and determination, and the purse, of the late Sir Charles Tennant, Bt., and the latter similarly by the late Mr. Christian Allhusen, until finally in the year 1890 these works were taken over by the United Alkali Co., Ltd. The decline of the industry, and the closing of the works which followed, demonstrate that processes which are no longer successful financially must ultimately terminate.

The first reports with reference to the ammonia soda process greatly disconcerted and dismayed the Tyne manufacturers. Their interests and their capital were locked up in the Leblanc process, and they were reluctant to believe in the merits of a process, which produced carbonate of soda without producing chlorine, and made use of an expensive and volatile re-agent. The ammonia process, however, proved entirely successful, and most of the Tyne works were ultimately compelled to yield to its pressure.

Though the ammonia process was a serious blow to the Leblanc process, it constituted nevertheless a great industrial advance, as it gives to the world practically pure carbonate of soda at a low price, thus supplying great impetus to many important industries. The erection on the banks of the Tyne of expensive plant for the production of electrical energy at a reasonable price has certainly strengthened the large chemical works at Gateshead, the property of the United Alkali Co., Ltd. The directors of that company have erected at their Gateshead works an important installation of plant for the electrolytic decomposition of brine, producing chlorine and caustic soda. The plant for the utilisation of energy is within these works, but the chief source of energy is supplied by the Newcastle Electric Supply Co., Ltd. An important adjunct to operations at the Gateshead works is the constant increase in the demand by collieries, gasworks, and others for sulphuric acid, a requisite raw material in the production of sulphate of ammonia. The Alkali Co. have at Gateshead a

very large and effective plant for the production of sulphuric acid, together with a plant on most up-to-date principles for the removal of the arsenic from the acid. At the Hebburn-on-Tyne works of the United Alkali Co. there is a large installation of plant for the production of soda crystals. There is also another large plant for the production of dearsenicated sulphuric acid.

The Tennant Family

In his notes on the Tennant family, Mr. T. W. Stuart states that up to 1785 all cloth made was bleached by exposing it to the sun's rays. In that year Berthollet used chlorine water for the first time and accomplished in a few hours what had previously taken months. Three years later, in 1788, Charles Tennant, then managing owner of a bleachfield at Darnley, near Paisley, simplified the problem by producing a solution of chloride of lime. Although the invention had immediate and far-reaching effects in the linen trade, it was not until 1797 that Tennant moved from his small works at Darnley, and with four partners, set up his chemical works at St. Rollox, Glasgow, under the name of Charles Tennant and Co. On April 30, 1799, he took out a patent for chloride of lime, to which substance he gave the name of "Bleaching Powder," and in 1799-1800 the St. Rollox Works produced fifty-two tons of this material, realising £140 per ton.

Mr. Charles Tennant, founder of the firm, died in 1838 at the age of seventy. Mr. Stuart, in his records of Glasgow, speaks of him as "a gentleman of remarkable business energy." The manufacturing establishment at St. Rollox under his vigorous management was rapidly extended in all its branches till it became the largest of its kind in Europe. As the discoverer of the power of hydrated lime to absorb chlorine and for bleaching powder, out of which the firm made large fortunes, his name will be handed down to posterity as a great benefactor to the world. After the death of the founder, the works were most efficiently carried on by his son, Mr. John Tennant, for about forty years, during which time the firm's manufacturing operations were greatly extended by the erection of their magnificent works at Hebburn-on-Tyne.

Mr. John Tennant was a man of great energy and ability, and was esteemed as one of the most honourable and upright of the merchants and citizens of Glasgow. After his death the direction of the business passed into the hands of his son, Mr. Charles Tennant, with whom were associated Mr. James Tennant of Fairlie and four other partners. In 1880 his son Edward, afterwards Lord Glenconner, joined the board, his father having entered Parliament as Liberal member for Glasgow the previous year. In 1885 Mr. Charles Tennant was made a baronet. The Hebburn works were started in 1865, and in 1887 the salt works at Middlesbrough were erected for the purpose of supplying the Hebburn works and the Jarrow Chemical Co.'s works with salt. Then in 1890, the United Alkali Co., Ltd., was formed—of which Sir Charles Tennant became the first honorary president. In the year 1906, at the age of eighty-three, Sir Charles died, leaving a fortune of over three million sterling.

Sir Charles Tennant, Bt., was a great captain of industry, not only with respect to his own various works and business firms, but also in regard to his immense interests in other companies. Possessing great wealth, he was very enterprising, spending large sums of money on plant and processes when he was convinced of their soundness. In the treatment of his partners and official staff he was most generous, while he also gave large sums to all deserving objects. He had an irresistibly charming personality, and his treatment of the most humble of his servants was delightful to see. His son, Edward, the late Lord Glenconner, possessed the same charming disposition, and, like his father, was much beloved.

Alkali Centenary's World Significance

Dealing finally with the world significance of the centenary, R. M. Bewick describes the immense part which alkali products play in commerce and civilisation, and the extent to which in all parts of the world they have made British chemical industry known.

It is only after visiting foreign markets, he writes, that one fully realises the value of the efforts made by the pioneers of the alkali industry in Great Britain to make known their wares throughout the world. For many reasons the continent of Europe does not play the same part in the English chemical trade as it at one time played. Tariff walls have been built up by all the principal countries of the Continent, and under the shelter of these contrivances many Continental markets built up a heavy chemical trade. In South Eastern Europe, in the countries of the Levant, and in Northern Europe the British manufacturer still has many interesting points of contact. Outside of Europe, he still enjoys the advantages of the work which was done for him by the early workers in chemical industry in the United Kingdom. Mexico, Central America, and South America still trade with him, and the very names by which the pioneers introduced themselves to buyers in these parts are still household words. In the Colonies and Dominions, South Africa, Australia and New Zealand are still buyers of British chemicals, while in India, China, Japan, Dutch East Indies, and the Straits Settlements not only has the position of the British manufacturer been maintained, but it shows progress to an extent which would astound the early pioneers of the industry. Chemicals have thus brought the United Kingdom into business relations with almost all the peoples of this earth, and therefore they have aided in that foremost of civilising factors, better mutual knowledge and appreciation between the peoples of the world.

The work of distributing chemicals to overseas markets was at first done by merchants; and no one can fail to recognise the great work which merchant adventurers have done for the commerce and industry of this nation. They wandered over the whole earth, establishing themselves in the various countries of the world, and making known to consumers the virtues of British wares. In the course of time, manufacturers found it necessary to explore foreign markets themselves. For the merchant adventurer, the chemicals he was selling were for the most part only names to him. This is in the nature of things; we cannot expect a merchant to have technical knowledge of all the products he sells, and, therefore, his place has been supplemented by the personal contact of the manufacturer with his customers abroad. This has been intensely interesting work. It brought the manufacturer into personal touch with foreign nations. In this way many difficulties were solved. The early travellers found that many of the problems to which they had to address themselves had been in former times treated with a certain amount of indifference, if not of disdain; but face to face with the consumer in different parts, the traveller realised to the fullest extent the situation with which he had to deal, and very often he was able to settle the matter on the spot, or, if he could not do so, he advised his house to proceed on wiser lines than had been the case under the former regime.

If the progress of sulphuric acid and soda be the mark of a nation's progress—and everything seems to point to the truth of such an assumption—then the chemical trade can claim to be a pioneer of civilisation, for wherever it has adventured in seeking to supply human needs, signal work has been accomplished in increasing sympathy and appreciation between this country and all the countries with which it has dealt.

The Centenary Dinner

(From Our Special Correspondent).

Liverpool, Wednesday evening.

The dinner at the Midland Adelphi Hotel here this evening was a representative and distinguished gathering, at which most of the great chemical interests of the country were represented. A large London party, organised by Mr. W. J. U. Woolcock, travelled specially up from London. It included Mr. Percy Ashby (Board of Trade), Mr. C. Atkins (Tennant and Sons), Mr. H. Bamford, Mr. Julius A. Brewin (Dyers' Company), Mr. Edgar P. Chance, Mr. J. R. Davies, Mr. B. M. Drake, Mr. Thomas Feilden, Mr. F. E. Hamer (The Chemical Age), Mr. C. A. Hill (British Drug Houses, Ltd.), Mr. W. W. King, Brig.-General A. H. Leggett, Mr. W. S. Lewis, Dr. Stephen Miall, Mr. Robert Mond, Sir Ernest Oldham, Sir James Ritchie, Mr. W. A. Tennant (Tennant and Co.), Mr. N. Garrod Thomas, Professor J. Thorpe, Major-General H. F. Thuillier and Mr. Woolcock. A detailed account of the dinner proceedings is reserved for next week.

Stainless Steel and Iron

The Conditions Affecting Corrosion

At the joint conference held on Friday, April 12th, by the Faraday Society, the Sheffield Section of the Institute of Metals and the Manchester Metallurgical Society was a paper by Mr. J. H. G. Monypenny, chief of the Research Laboratory, Brown Bayley's Steel Works, Ltd., Sheffield, dealing with the above subject. He referred first to the general constitution of stainless steel. When studying the resistance of stainless steel to the action of different corroding media it was of paramount importance, he said, that the influence of varying composition and varying heat treatment were kept in mind, as both these factors might influence very considerably the resistance of the material to attack. It appeared to have been quite widely held that stainless steel was a material of one definite composition and a small range of mechanical properties. This was not the case, however, as there was a whole range of steels in which the main variable from the point of view of general properties was carbon, precisely in the same manner as this element was the prime factor in producing hard and soft steels. In addition to this the presence in varying amounts (either through accident or design) of other elements such as silicon, manganese, or nickel might have appreciable effects on the properties of the steel. It was reasonable to expect that variation in one or more of these elements might have quite appreciable effects on the resistance to corrosion of the stainless material.

In addition to differences in chemical composition, the properties of the material might be profoundly modified by varying forms of heat treatment, and such variations had pronounced effects on the degree of resistance of the material to corrosion.

In discussing the corrosion of any metal or set or metals it was generally a matter of considerable difficulty to record adequately the comparative behaviour of the several samples. It had been established by the author, however, that tap water was without action on stainless steel in either the hardened, or hardened and tempered condition. A number of small samples turned from a hardened and tempered bar over which tap water had been allowed to trickle for over twelve months showed not the slightest signs of attack.

Samples of stainless steel and iron in the hardened and tempered condition were tested in sea-water by being partly embedded in a block of wood and the latter then fixed to a jetty at a point between high and low water marks. The samples were thus alternately wet and dry. After six months they were quite bright and practically unattacked, there being only a few minute pits; thus a sample weighing 150 grm. and having a surface area of about 47 sq. cm. had a total loss in weight of 1 cg.

River and well waters, ammonia, alkalies and alkaline carbonates in all strengths of solution appeared to have no effect at all on stainless material.

Corrosion by Salts and Acids

Ammonium chloride solutions were well known as corroding agents. They had a staining and pitting action on stainless material the extent of which, however, depended on the concentration of the solution. Ferric chloride solutions attacked the steel even when fairly dilute (e.g., 1 per cent.). Copper chloride solutions also attacked the steel. Copper sulphate, nitrate, and acetate solutions on the other hand, had no action on the steel. The presence of copper sulphate also appeared to retard greatly, and in some cases to prevent the attack of dilute sulphuric acid on stainless material.

The use of stainless steel for cutlery purposes had been the cause of the use of vinegar as a kind of test reagent. Commercial vinegars varied to some extent in the corrosive action. Most commercial vinegars contained about 4 or 5 per cent. of acetic acid. A pure solution of acetic acid of the same strength, however, attacked stainless steel quite distinctly, much more so than vinegar. Fruit juices acted in a similar manner to vinegar.

Hydrochloric and sulphuric acids attacked stainless steel or iron rapidly, while the attack of nitric acid presented several interesting features. Very dilute solutions of the latter acid attacked stainless material slowly, the rate of attack decreasing with increasing content of chromium, and with decreasing carbon content. The stronger acids used in analytical work (e.g., S.G. 1·20 and 1·42) were practically without action on the steel. With prolonged attack (e.g., lasting a month or six weeks) of acids of these strengths, the surface of the steel was coloured a purplish tint, but there was no appreciable alteration in weight. The colour thus produced bore some resemblance to a "temper colour" and was probably of a similar type to the latter.

The effect of atmospheric corrosion depended on the location of the test. In towns, especially in the neighbourhood of works, samples exposed for prolonged periods became coated with a dark brown coating. Such a coating might often be rubbed off leaving an almost unimpaired surface; at other times the coating appeared to induce minute pits in the surface of the steel underneath. In purer atmospheres, e.g., in the country, stainless material would remain unattacked for long periods.

The results on test samples placed in steam pipes and also on actual boiler and steam pipe fittings (e.g., blow-off valves, steam cocks, etc.) showed that stainless steel resisted the action of steam remarkably well, e.g., steam valves working on slightly superheated steam at a pressure of 120 lb. per square in. had been quite unaffected after several months' use. The material also resisted erosion by the steam very well. Lubricating oils, greases, etc., benzol, paraffin, and petrol did not appear to have action at all.

A polished sample of stainless steel on being gradually heated assumed the well known temper colours similar to those produced on ordinary steel but at considerably higher temperatures than with the latter steel.

A Brunner-Mond Jubilee

Following upon the Alkali Centenary celebrated this week, Messrs. Brunner, Mond and Co. are now engaged in preliminary arrangements for celebrating in a similar way the jubilee of that great concern. Mr. Robert Mond, in some conversation in the train, confirmed this announcement, and said that the celebrations would probably take place in June at their Cheshire headquarters. "I thoroughly believe in the public celebration of great occasions like this," he said. "They have an excellent effect in bringing all concerned in the business together and in stimulating the pride and interest of all members of the staff. Not only is it well for all engaged in the company's work to learn something of its history and achievements and to pause occasionally to look back on what has been done, but it has a good effect on public opinion by showing the great things which British science and commercial organisation combined have done for the country and for the world."

Resistivity of Iron

The chemical industries use large quantities of ferrous metals for plant construction and equipment. Maintenance economies and conservation of natural resources demand a careful consideration of the relative resistivities of ferrous metals to corrosive influences, it being essential that iron be chosen which possesses a high resistance to chemical action.

Comparative data secured by scientific tests, carried out by Mr. D. M. Strickland of the American Chemical Society, indicated the resistance of commercially pure iron, this being especially good, even in respect to the action of acids, alkalies and other chemicals. Interesting and instructive service tests were furnished showing the use of commercially pure iron throughout the chemical industry.

Demand for Scientific Apparatus

His Majesty's Trade Commissioner in Vancouver, British Columbia (Mr. L. B. Beale) reports that the authorities of the University of British Columbia are desirous of receiving from United Kingdom manufacturers illustrated catalogues, full particulars and prices of scientific apparatus. Further particulars, together with the names of the enquiriers, may be obtained by United Kingdom firms interested upon application to the Department of Overseas Trade (Room 53), 35, Old Queen Street, London, S.W.1.

Society of Chemical Industry

Annual Meeting of the Birmingham Section

THE annual meeting of the Birmingham and Midland Section of the Society of Chemical Industry took place at the Birmingham University on Tuesday, April 10, Dr. E. B. Maxted presiding over a representative attendance of members.

The following officers were elected :—Chairman, Dr. E. B. Maxted ; vice-chairmen, Professor G. T. Morgan and Mr. F. R. O'Shaughnessy ; hon. secretary and treasurer, Mr. Geo. King ; hon. auditor, Mr. C. Watson. The following were elected to the Committee : Messrs. D. F. Twiss, A. W. Knapp, W. A. S. Calder, W. T. Collis and A. E. Johnson.

Mr. King reported that nine meetings were held during the session, and the average attendance was 54. During the coming sessions visits would be made to works, including the B.S.A. Co. in May and the General Electric Co. in June. Subject to the approval of the Council, the Committee recommended the creation of an associate group of the Birmingham and Midland Section. This scheme would embrace those under 24 years of age who desired to receive all local section communications and to attend meetings and other functions. A fee of 2s. 6d. would be made to cover expenses. Such associates would, however, be ineligible for election to the Committee and would not receive the Journal. They would not be considered associate members of the Society, but rather as associate members of the Birmingham Section.

The Secretary further reported that, under the scheme of co-operation with the Chemical Society, it was proposed to extend it to the Faraday Society. During the year the library at headquarters had been dispersed, and the Birmingham Section had received a number of journals and some patent literature. These had been passed to the University Library, Edgbaston, where they might be consulted by members of the Society of Chemical Industry.

In conclusion, Mr. King asked for the more active co-operation of the members of the Society. It included in its membership chemists of all grades—directors, manufacturers, chief chemists, and under the Associate scheme, juniors. The average attendance at meetings was less than 20 per cent. of the membership. The Committee therefore looked for and expected considerably more support from the main body of members.

The Chairman observed that the past successful season had been due to a very large extent to the public spirited work of Mr. George King, who was to be congratulated upon the excellent series of meetings Alluding to the programme for next session, he mentioned that the idea of holding a symposium for the consideration of " Colloids " was favoured, but whether it would be arranged would depend upon the support likely to be forthcoming. Suggestions in relation to papers and offers of papers were invited.

Nitrates from the Air

The Second Cantor Lecture

THE second of the three lectures on " Nitrates from the Air " was given by Mr. E. Kilburn Scott, at the Royal Society of Arts, London, on Monday.

He first emphasised certain points in connection with the arc process, which he dealt with in the first lecture. The most important factor in reducing the working cost was to obtain a higher concentration of the nitrous oxide product, as then the absorption was much simplified and working costs reduced. This end had been obtained in the recent German plant, in which the absorption was carried out at 0° C., and the 50 per cent. acid was passed back into the tower to absorb more gas. Another way to improve the yield was to add oxygen to the air used. This needed a raw material, but oxygen was really a by-product of the cyanamide and ammonia processes, also in view of the coming lapse of liquid air patents he expected oxygen to become very much cheaper in the future. By increasing the pressure in the furnaces, say, to three or four atmospheres, the yield was also increased, and the subsequent expansion of the gases not only cooled them but enabled some of the energy required for compression to be returned.

There was plenty of electric power available in this country for development of the arc process (which he personally favoured) or one of the other processes to be described. It did not matter which, but he emphasised the point that Great Britain was now the only nation which had not a plant for producing nitrates from the air. Chile nitrate, at an average price of £13 per ton, gave a product of 65 per cent. nitric acid at £20 per ton. If electric energy cost £10 per kilowatt-year, nitric acid could be produced at this figure ; and as using electricity produced from coal by present methods, the cost was only £3 10s. per kilowatt-year, the thing was obvious. Since the plant standing idle at our present generating stations during " off-peak " periods could be utilised, the maintenance charges would be even lower. Why was this not done ? He ventured to give a reason—namely, that the Chile nitrate interest was so strong as to prevent the obvious development. There was, of course, the plant at Billingham-on-Tees.

He next referred to the Häusser process, in which coke-oven gas was sparked with air or oxygen under high pressure in a special bomb. The results were fairly satisfactory, especially for relatively small-scale production.

Review of the Cyanamide Process

He then passed on to the cyanamide process, dealing mainly with the American plant which he was familiar with, although there was a very large plant at Odda, in Norway, for making cyanamide, which had recently failed owing to purely financial causes. The American plant at Muscle-Shoals, Alabama, was built during the war by 12,000 men in four months. There were, of course, three stages in the production of ammonia by the process, and a fourth stage if nitrates were required. The first two stages were already established industries, and the product cyanamide, itself a fertiliser, was first obtained from the American Cyanamid Co. at the rate of 50 tons per day, to be converted into ammonia at Muscle-Shoals. Plant for all stages was, however, laid down, but it has not been used since the war.

Calcium carbide, the first product, was obtained in the usual way from coke and lime, and was then ground up in an atmosphere of nitrogen (obtained from liquid air). The ground product was then heated in electric furnaces, which he described, nitrogen being lead in, and after several hours the product calcium cyanamide (nitrolim) was obtained, according to the reaction :—

$$CaC_2 + N_2 = CaCN_2 + C$$

This again was ground up very fine after first being dampened to remove any unchanged carbide, and put into an autoclave into which superheated steam at 150 lb. pressure was passed, when the conversion to ammonia proceeded readily approximately according to the equation :

$$CaCN_2 + 3H_2O = CaCO_3 + 2NH_3.$$

The ammonia was either converted to sulphate or to nitric acid (by oxidation), but there was now a scheme to produce ammonium phosphate as a fertiliser in connection with the recently developed process for obtaining phosphoric acid from phosphate rock. The raw materials being lime and coke, there was, again, no reason why the cyanamide process should not be developed in England.

The third and final lecture will be delivered on Monday next, when the direct ammonia processes and the oxidation of ammonia will be dealt with. It is understood that a discussion will follow.

Leeds Chemistry Professorship

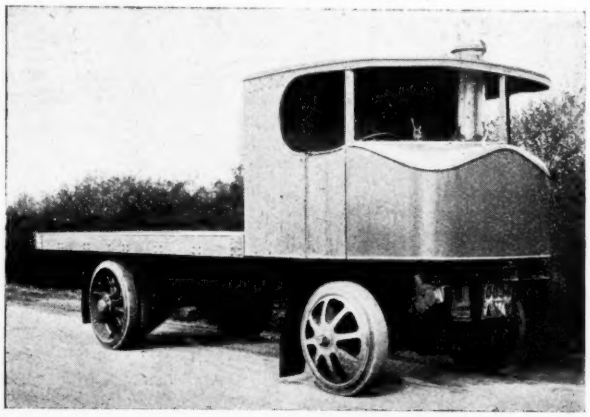
AT a Council meeting of Leeds University on Wednesday, Mr. R. W. Whytlaw-Gray, O.B.E., Ph.D., Fellow of University College, London, was appointed Professor of Chemistry, as from October 1 next, in succession to Professor Arthur Smithells, F.R.S. From 1900 to 1902 Dr. Whytlaw-Gray worked under Sir William Ramsay on a re-determination of the atomic weight of nitrogen. In 1906 Dr. Whytlaw-Gray was appointed on Sir William's staff at University College, London, and in 1908 he became Assistant Professor. While on the staff of University College Dr. Whytlaw-Gray conducted important investigations on the physical constants of gases, and was associated with Sir William Ramsay in the well-known work on radium emanation (niton). During the war he also acted as civilian chemical adviser to the Chemical Warfare Committee and devoted his spare time to research on the chemical problems involved in gas warfare. The results of his investigations have been exceptionally important.

A New "Sentinel" Waggon

Improvements in Design and Efficiency

A DEMONSTRATION of a new type of steam waggon, to be known as the "Super-Sentinel," was given at the Sentinel Waggon Works, Shrewsbury, last week, to a number of guests. The party was conducted round the works by members of the staff, including the sales manager (Mr. Tutt) and the works manager (Mr. Weavell). The managing director (Mr. Alley) was unable to be present. The details of the new waggon were shown in various stages of construction and the completed unit was demonstrated in the shed, turning about in a very small space. The party was also conveyed back to the station on one of the waggons, a journey at a speed that would have left a motor-bus behind, and which was marked by several smooth and rapid retardations and accelerations.

The old-type "Sentinel" waggon, with its vertical boiler and underslung engine, is well known, and the new "Super-Sentinel" type resembles it in appearance and general lay-out. The principal difference is in the constructional details, which



have all been entirely re-designed. The new model, which is to be available in 4-ton and 6-7 ton sizes, and also as a 10-ton six-wheeler, will entirely replace the old pattern which will not be manufactured in future. The new model provides an extra reserve of power and lower operating costs, and will also carry heavier loads at higher speeds in view of the possibility of future legislation removing the present speed limits. The details have been re-designed with this end in view, and with the object of reducing manufacturing costs by simplification, which leads to lower maintenance charges for the owner, as parts can be detached for cleaning or overhauling much more readily.

With regard to the new design, the boiler, although greatly improved, consists as before of a water tube pattern with central flue-tube firebox. The latter can be readily detached for cleaning without disturbing any pipe joints, and there is no scraping of inaccessible parts, everything being visible. A chemical engineer would appreciate an evaporator with these advantages.

The most noticeable point of the new vehicle is the design of the differential gear. In the old "Sentinel" this was of a conventional type and was housed in the chain wheel on the back axle. The new "Super-Sentinel" differential is in the crankshaft of the engine itself. This patented feature has enabled the designers to dispense entirely with layshafts and bevel gears, thus retaining all the old simplicity of the "Sentinel," and yet get the great advantages of an unbreakable stationary back axle, a smaller lighter differential which can be housed where no road dust can reach it, and reduced wear on tyres and road. The new design of differential has enabled the makers to incorporate in it a friction device whereby the differential itself is prevented from functioning until there is about 15 per cent. difference in tractive effort at the rear road wheels. This last feature has resulted in a waggon which is practically immune from side slip, so that it can be driven over a polished steel surface covered with french chalk, while the old waggon became uncontrollable under such a severe test.

There is not space to consider in detail the other features, all of which appear to have been extremely well carried out, but mention must be made of the lubrication system, by which all parts of the engine are lubricated mechanically from a single oil box, which is refilled daily. It will be remembered that the waggon is designed to burn coke, but will also burn coal, or even wood or charcoal. With coke the consumption is ·6 lb. to ·7 lb. per ton-mile, while coal gives ·56—·6 lb. per ton-mile. As an example of the power available the waggon will take 20 tons over Wenlock Edge, a long grade of 1 in 6½ maximum. Extremely smooth running is obtained because there are no gears (other than the differential), all speeds being obtainable on the throttle, while reverse is obtained by altering the camshaft timing, which operates the poppet-valves of the engine, thus producing remarkably easy manœuvring.

Conditions of Railway Transport

AT a sitting of the Railway Rates Tribunal on Tuesday, it was announced that it had been agreed that "In the event of any loss of, or damage or delay to, merchandise arising from a defect in a truck or sheet not belonging to or provided by the railway company, and upon proof by the company that such loss, damage, or delay was not due to any negligence of the company's servants, the company shall not be liable," etc. This was adopted.

The Tribunal approved a condition as proposed by the railway companies, providing that, "Where loading or covering is performed by the sender, the railway company shall not be liable for loss, damage, or delay upon proof by the company that such loss damage, or delay would not have arisen but for faulty or improper loading or covering on the part of the sender."

On the only other outstanding condition on which there had been contention between the parties before the Tribunal, the following was agreed upon and approved by the Tribunal: "In the absence of written notice to the contrary given to the railway company at the time of delivery to them, all merchandise is warranted by the sender to be fit to be carried or stored in the condition in which it is handled to the company, and not to be merchandise included in the Dangerous Goods Classification or unclassified merchandise of a kindred nature."

The Cheshire Salt Industry

MR. W. J. LEWIS lectured before the Geographical Association at Birmingham University on Thursday, April 12, on the geography of central Cheshire with special reference to the salt industry. Alluding to the salt deposits of the county, he said there were two layers about 90 ft. thick. It had been shown recently that the salt field extended a good deal further south than was previouly thought, and making a very conservative estimate it was probable at the present rate of output that the Cheshire salt field would last another thousand years. The salt trade grew steadily until the early eighties, after which it went down to 57 per cent. of the record output—over 2,000,000 tons in 1884—and now it stood at about 72 per cent. of that record. He attributed the decline to the development of other salt fields in the British Isles; to the competition of central Europe, where there were pure deposits of natural rock; to the development in America; to the competition of hot countries where sea salt could be produced; and to some extent to tariff barriers. In the early eighties they appeared to be in possession of most of the world markets, but since then many of their customers had developed their own resources, and the future of the industry lay with the development of the alkali trades based upon salts.

Acid and Chemical Proof Stoneware

STONEWARE has a large field of usefulness in chemical plants, but is subject to limitations as to size and tensile strength requirements. Progress is being made in the successful manufacture of larger pieces and in obtaining stronger bodies. In some cases modern chemical stoneware will withstand more mechanical punishment than will some of the compounded ferrous alloys. The present tendency is to make the walls of tanks as thin as possible, and much has been accomplished in producing lighter pieces which yet combine strength and immunity to corrosion.

Chemical Matters in Parliament

The National Physical Laboratory

Replying to a question as to the expenses and control of the National Physical Laboratory by Sir P. Newson (House of Commons, April 12), Lord E. Percy said that having regard to the fact that the work done at the National Physical Laboratory was mainly undertaken in the national interest, he did not consider that a change was desirable. As the figures already supplied to the hon. member showed, work undertaken for outside bodies was paid for by them.

Decolourising Carbon

Mr. Robert Young (House of Commons, April 16), asked the President of the Board of Trade what the quantity and value of decolourising carbon imported into this country was during the years 1920, 1921, and 1922, with the amount and value of such imports from Holland, Germany, Austria, and America, respectively; and also what amount was re-exported during the same period? Lieut.-Colonel Buckley replied that he regretted that he was unable to furnish the particulars desired.

The Price of Nitrate

Mr. T. Smith (House of Commons, April 12), asked the Minister of Agriculture whether he was aware that the nitrate producers' ring decided, at a meeting held in London on March 27, to increase the price of nitrate, one of the farmer's most important fertilisers; and whether he would see that any subsidies or protection granted to the farmers did not result in these rings and combines taking all the benefit? Sir R. Sanders replied that since the answer to the first part was in the negative, the second part of the question, therefore, did not arise.

Central Importing Agency

Mr. Pringle (House of Commons, April 17) asked the President of the Board of Trade for what reason the Central Importing Agency was suddenly terminated, to which Viscount Wolmer replied that the agreement with the Central Importing Agency was terminated on August 31, 1922, as the Board of Trade were satisfied, after full consideration, that it was desirable to make other arrangements. These arrangements were completely satisfactory, and he doubted whether any useful purpose would be served by going into the detailed reasons which, in the opinion of the Board, rendered a change desirable.

Potash from Germany

Dr. Chapple (House of Commons, Wednesday, April 12) asked the Financial Secretary to the Treasury the amount of potash received from Germany for agricultural purposes since the Armistice; its cost; and the price paid for it by the farmers.

Viscount Wolmer stated that the quantities and declared values of potassium salts largely but not wholly used for manurial purposes imported into the United Kingdom and registered as consigned from Germany during the years 1920, 1921, and 1922, were as follows:—

	Quantity imported. Cwts.	Declared value. £
(*a*) Potassium Chloride (Muriate):		
1920	119,447	140,261
1921	83,612	62,562
1922	348,201	147,334
(*b*) Kainit and other Potash fertiliser salts, not elsewhere specified:		
1920	230,077	119,190
1921	607,648	118,664
1922	1,989,618	189,366
(*c*) Potassium Sulphate:		
1920	103,450	127,889
1921	47,870	39,465
1922	156,473	95,553

He was informed that 12½ per cent. kainit was sold to farmers at an average price of £5 3s. per ton in 1921, and £2 15s. per ton in 1922. These prices were for two-ton lots free on rail.

Dr. Chapple then asked the Minister of Agriculture the average amount of potash used by agriculturists in Great Britain for manurial purposes; and the average cost, to which Major Barnston replied that no very reliable data existed of the extent to which potash was used by agriculturists, but in 1912 it was estimated that 80,000 tons were so employed in the United Kingdom. In 1922, the whole imports into Great Britain and Ireland of potassium compounds (excluding nitrate of potash) amounted to 200,357 tons of an average value of about 93s. per ton.

The Shortage of Coke

Mr. Hardie (House of Commons, April 12), asked the Secretary for Mines whether he had been made aware of the statement made on behalf of the iron and steel trade in Sheffield and Rotherham that the works could not take orders owing to the shortage of coke; and if he would take steps to have a home supply secured? Viscount Wolmer, replying, said that the attention of the Secretary for Mines had been drawn to the short supplies of coke. Every effort was being made by suppliers of coke to meet inland requirements, and it was hoped that supply would soon overtake the recent sharp increase in demand.

The Associated Portland Cement Manufacturers

At the general meeting of the Associated Portland Cement Manufacturers, Ltd., held on Thursday, April 12, Brigadier-General F. C. Stanley, C.M.G., D.S.O. (the chairman), said that the period covered by the accounts had been a very difficult one for the cement trade. In view of the widespread depression caused by the unsettled state of international affairs and depreciated Continental currencies which were seriously affecting business transactions throughout the world, the deliveries of Portland cement in the home trade were less than those of the previous year. The tonnage exported, however, showed a substantial increase, although it was still well below pre-war quantities.

He referred to their acquisition of the works and other assets of the Kent Portland Cement Co. These were producing a bigger tonnage of cement than was originally anticipated, and at a satisfactory cost, while the quality was excellent. There was no doubt that in the Kent they possessed one of the finest and most up-to-date works in this or any country. They had had many delays in completing the works in India due to climatic conditions and strikes. They were now producing cement of an excellent quality, however.

In view of certain statements which had appeared in the Press, and for the general information of their consumers, he thought it desirable to say something regarding the cost of manufacture, and as to the selling prices of Portland cement. In the years before the war it was possible to gauge prospective costs of manufacture almost to a nicety, certainly to within a shilling a ton, owing to the fact that the various items making up the total cost fluctuated within comparatively narrow limits. Since that date this had become utterly impossible for reasons which would be apparent; and even to-day, more than four years after the termination of the war, they were faced with violent fluctuations in the price of fuel, for instance, which was one of the largest items in their manufacturing cost. It had also been suggested that the price of cement was one of the factors holding up the building of houses. Even if they could reduce their price by a further 10s. per ton (which would absorb their full net profit) the cost would be reduced by £2 10s. per house, or less than 1 per cent. The accounts and the dividend earned furnished, he thought, ample proof that the policy of reducing the cost of cement to the consumer had been carried to the extreme limit consistent with a modest return to the shareholders who had invested their capital in the company.

British Trade in the Ruhr

In a debate on British trade with Germany in the House of Commons (Wednesday, April 12), it was suggested by Captain Wedgwood Benn, Mr. F. Gray and others, that the occupiers in the Ruhr were deliberately hampering British trade. It was admitted by Sir P. Lloyd-Greame that the Government had so far only been able to obtain a few concessions from the occupiers, but the suggestion was repudiated and it was pointed out that the whole volume of British trade with Germany was not unduly diminished by the French action. The discussion proceeded on very general lines, though a few individual cases were mentioned.

German Chemical Industry.

THE German potash industry, which experienced a boom during 1922, is now affected by the general depression, says *The Times* correspondent in Berlin. Home demand, which has always been the chief support of the fertiliser trade, is declining rapidly. Agricultural products are cheaper, but costs remain at the same high level. Most farmers are, therefore, using up the stocks they laid in during the last few months, and awaiting a reduction in price before replenishing them. Others are cutting down their orders to urgent requirements.

The scarcity of capital is beginning to be felt in agriculture, and is reacting on the potash business. In consequence, a number of works in Central Germany are curtailing production. They are working on short time and storing the greater part of their output. The industry will have to lower prices in order to stimulate demand. Wages, which amount to about 40 per cent. of the cost, cannot be reduced, but negotiations with the Government for a further reduction of freight rates for potash are pending. There are not enough foreign orders to compensate for the decrease in home demand, and trade with the United States has been below expectations. The Alsatian potash works are making great endeavours to beat the Germans in that market by undercutting.

As the largest German caustic soda works, Würselen and Stolberg, near Aachen, is cut off by the Franco-Belgian occupation, a marked scarcity of this commodity is apparent in other parts of Germany, and is causing trouble to the soap industry and other chemical works, as well as the textile and artificial silk industry. Large quantities are, therefore, being imported from Great Britain and Poland, and steps have been taken to procure further supplies from other countries.

Conditions in the dye industry vary in the different districts. As most of the works are situated in the occupied area, they are cut off from their principal markets. Ludwigshafen has had to restrict production, whilst the Badische Anilin and Sodafabrik and the Oppau works are faced with the same prospect. The Höchst works are also reducing their output, and Elberfeld is experiencing considerable trouble in keeping its works going. Leverkusen, in the British zone, is in a more favourable position, having adequate supplies of fuel, mainly lignite. The industry has sufficient stocks in different parts of Germany to supply its customers for several months. The Austrian Continental Nitrogen Company, which has a majority of German shareholders, is erecting a large nitrate of lime factory on the Austro-Bavarian frontier near Gollingen, between Salzburg and Berchtesgaden.

The Affairs of Kelasto and Recelt Co., Ltd.

A MEETING of the creditors of Kelasto and Recelt Co., Ltd., Paint Manufacturers, late 39, Victoria Street, London, S.W. (in voluntary liquidation) took place on April 12.

Mr. Taylor, the liquidator, who presided, stated that he had very little information to give to the creditors, and the matter was somewhat complicated by the fact that a little time ago a sum of £1,500 had been raised and this money had been distributed among certain of them. At the time £1,500 was provided it was hoped to pay all the other creditors under £10 in full. When the debenture was issued it was understood that this course was for the purpose of preserving the assets of the company for the general benefit of creditors. Unfortunately certain action was taken, and the bailiff was put in possession of the company's property. The trustees for the debenture holders then applied to the Court and were successful in getting the bailiff to retire and the receiver then took possession of the assets. In reply to a creditor the liquidator stated he was unable to furnish any details of the company's financial position but he believed that the unsecured liabilities were in the neighbourhood of £4,000, and he had been informed that assets had been realised to the extent of about £1,627. It was decided to confirm the appointment of Mr. Taylor as liquidator, but no committee of inspection was appointed. The liquidator however, undertook in case of need to refer to three of the principal creditors, whose names were mentioned at the meeting, and consult with them as to the administration of the assets, should any such assets come into his possession. The liquidator expressed the opinion, however, that the resulting dividend to creditors was likely to be very small, if anything.

Chemicals and Fertilisers in Germany

IN an official report forwarded to the Department of Overseas Trade from the Commercial Secretary at Berlin, Mr. J. W. F. Shelwall, it is stated that owing to the fact that prices in the chemical industry had reached and partly exceeded the world's market level, foreign orders declined. Competition with foreign countries was rendered particularly difficult by the high railway freights, postal fees, and coal prices. In expectation of a reduction of prices, inland customers covered only their immediate needs in small quantities. There was still in stock a heavy proportion of goods purchased at high prices in January and February which could be disposed of only at a substantial loss. Business in chemically pure reagents and preparations was almost completely at a standstill, owing partly to the closing of all institutes and universities for the Easter holidays.

In the potash industry the market conditions in March were very unfavourable. In particular, German agriculture, whose demand in this month is usually very great, limited its purchases very considerably. The reason for this lay partly in the high prices of potash and coal, and also high freights, and partly in the fact that German farmers covered their requirements sufficiently in previous months at cheaper potash prices and freights. Foreign trade was confined within comparatively narrow limits; only for sulphate of potash salts was the demand satisfactory. In consequence of diminished sales, individual potash works had to drop shifts. The market for the by-products of the potash industry also left much to be desired. The truck supply was good.

According to the *Berliner Tageblatt* of April 7, the market for nitrogenous fertilisers in March was completely stagnant. Whether the cause is to be sought rather in the excess supplies held by farmers, agricultural associations and the trade, than in the improvement in the mark and the difficult conditions of credit is uncertain. Some factories in Occupied Territory had to cease work. Prices during March were such that German nitrogen was still cheaper for the consumer than foreign nitrogen. In order to afford farmers who have not yet placed their spring orders the possibility of purchasing nitrogenous fertilisers cheaply, the Nitrogen Syndicate has decided to sell such fertilisers for the time being at considerably reduced prices, which are quite out of proportion to the reduction in coal prices of April 1.

Chemical Trade in Belgium

THE Commercial Secretary to H.M. Embassy at Brussels, in his Report on the Economic and Financial Conditions in Belgium, states that the general situation in the chemical industry is good and business is developing satisfactorily, both in the home and export markets, particularly in the latter. Supplies of raw material are being received regularly, but as prices have risen owing to the exchange crisis, efforts are being made to replace stocks imported from countries with appreciated exchanges. There is, however, a difficulty in obtaining a sufficient supply of labour.

There is a good demand for all kinds of mineral acids, especially for sulphuric, hydrochloric and nitric acids. Stocks are, however, small, and the renewed activity in the glass industry has caused a shortage of sulphate of soda. Abundant orders have been received in the chemical oils industry, and some factories are working double shifts.

The prices of oils, glycerin, caustic potash and carbonate of potash are firm, and as a consequence sales have become restricted. Soap factories generally are experiencing difficult times, whilst some of those making toilet soaps and hard household soaps are reducing the number of their hands.

There is a good demand for chemical manures, and the general position is good. There are important orders on hand, but the shortage of labour has somewhat retarded deliveries.

The principal articles of export were sulphuric acid and nitrate of soda. The value of the trade in sulphuric acid was 32 million frs., and in nitrate of soda 55·7 million frs. The sulphuric acid went principally to Germany (18·6 million frs.), and the Netherlands (11·1 million frs.), whilst the nitrate of soda went to the United States (9·5 million frs.), Egypt (9·5 million frs.), Germany (8·7 million frs.), the Netherlands (8·3 million frs.), Spain (7·2 million frs.), Switzerland (5·2 million frs.) and Russia (1·9 million frs.).

From Week to Week

A SEMI-OFFICIAL STATEMENT in Paris is said to have denied the report which appeared in a trade journal on Friday, April 13, in regard to proposed restrictions on exports of British coke to France.

MEMBERS of the Newcastle section of the Society of Chemical Industry visited the Ford potteries of Messrs. C. T. Maling and Sons, Newcastle, on Wednesday, April 11, when they were shown the works by Mr. Fred Maling and Mr. John Porteous, foreman.

A REPORT from Antwerp states that the through traffic of nitrates has assumed of late unexpected proportions. During the week ending April 14, several cargoes varying from 8,000 tons to 14,000 tons—the heaviest yet known in Antwerp—were unloaded.

A RECENT ANNOUNCEMENT that Professor M'Lennan, of the University of Toronto, Canada, has been able to liquefy helium gas under circumstances which will enable it to be employed economically in commerce is reported to have greatly impressed scientific circles there and in the States.

JAMES GORDON AND CO., LTD., Windsor House, Kingsway, London, W.C.2, announce that they have recently acquired a licence for the manufacture and sale in Great Britain of the Duplex Mono Recorder, a flue gas analysis apparatus which automatically records on one chart both CO_2 and combustible gases.

AT NEWCASTLE, on April 11, at a general meeting of the local section of the Society of Chemical Industry, M. Braun, chairman of the "Société de Nitrat," an eminent French chemist, delivered in English an interesting lecture on "Fertilisers and Chemical Industries, in relation to the Ruhr situation, and present conditions."

THE BRADFORD DYERS' ASSOCIATION are about to establish a pension scheme for about 10,000 adult male workpeople, and the shareholders have backed the project with a gift of £100,000. Under the scheme a pension of £1 per week is payable to every man at the age of 65, and a life policy for £100 is granted to each without medical examination.

THE BULLETIN of the Federation of British Industries has a note on the effect of the French occupation of the Ruhr on the chemical industry of this country, confirming that the general tendency of prices in the chemical market is upward, owing in large measure to the Franco-Belgian occupation of the Ruhr and the subsequent almost complete stoppage of supplies from Germany.

A VALUABLE SELECTIVE USE of kainit as a fertiliser is described in a leaflet just issued by Mr. G. A. Cowie, M.A., B.Sc., F.I.C. Application, under certain definite conditions, of this substance to crops such as oats not only improves the yield directly but kills off certain undesirable weeds, such as charlock. Mr. Cowie will send further particulars on application to 39, Victoria Street, London.

IN VIEW of the repeated references to the need for calcium arsenate to save the American cotton crop from the ravages of the boll-weevil, an article published in the *Times Trade Supplement* is of interest in mentioning that the means of eradicating the boll-weevil is to dust the cotton plant at night with calcium arsenate. The dew becomes impregnated with arsenic and the weevils are poisoned by drinking it.

A CINEMATOGRAPH FILM dealing with Coal Dust Explosions has been prepared by the Mines Department Experimental Station, Eskmeals. The film clearly shows the danger of allowing coal dust to accumulate. It will be loaned free of charge to those interested. Application should be made to the Secretary, Safety in Mines Research Board, Mines Department, Dean Stanley Street, Millbank, Westminster, S.W.1.

ACCORDING to the official publication, *Surplus*, several government factories are to be sold, including one at Gretna containing a large alcohol and ether manufacturing plant, one at Queensferry (Cheshire), and one at Bradley, near Huddersfield, for the manufacture of TNT. and similar explosives, suitable for fine chemical work, also the wood distillation factories at Ludlow and Chichester, and a large chemical factory at Ellesmere Port.

SIR ERIC GEDDES, as president of the Federation of British Industries, on Tuesday addressed a letter to the Railway Clearing House appealing for a bold policy in reducing railway rates, in view of the fact that the traffic receipts, with the present reduced rates, were steadily rising above the figures for the corresponding dates in 1922, and that the upward movement in traffic commenced immediately after the general reduction of rates and charges on August 1 last, and had continued steadily ever since.

THE PRIVY COUNCIL has asked the General Medical Council for its opinion on a proposal that in future strychnine should be coloured brilliant green, a dye which was recommended to the Privy Council as a colouring for strychnine by the Pharmaceutical Society of Great Britain. The final choice lay between that dye and methyl violet, which was discarded as being less distinctive. The present proposal is the first definite result of the suggestion made by several of his Majesty's judges that poisons should be coloured.

A REPORT was issued by the Conjoint Board of Scientific Societies last Saturday. A most important work undertaken by the board in the period 1916–1923 had been that of its Committee on the Water Power Resources of the Empire, which had drawn up three reports. The board had also given careful consideration to every proposal or suggestion brought before it by the representatives of the constituent societies or by the societies themselves. This had involved in many cases the collection of large volumes of data. The work of the board had been hampered—states the report—by lack of sufficient funds.

A VERDICT of "Accidental death" was recorded at an adjourned inquest at St. Pancras on Saturday, April 14, concerning the death of Thomas William Stone (54), of Kentish Town, employed by Winsor and Newton, Ltd., Kentish Town. Mr. John Webster, senior analyst to the Home Office, stated that he detected minute traces of cadmium in deceased's lungs. Dr. M. R. Bronte, pathologist, stated that death was due to cardiac failure from fatty degeneration of the heart muscles and other organs, accelerated by the inhalation of fumes produced in melting cadmium. He was of opinion that if Stone had had medical attention his life would have been saved.

A MESSAGE from Newhaven, Connecticut, says at a meeting there recently, the introduction of small quantities of a newly-discovered lachrymatory gas into illuminating gas was advocated by Brigadier-General A. A. Fries, chief of the Chemical Warfare Service of the United States Army, who said it would prevent many suicides by gas poisoning. General Fries announced that his department had discovered the gas as a result of its work with poison gases since the war. The amount of gas needed to produce sneezing would not injure anyone inhaling it, nor would it impair the lighting qualities of the illuminating gas. The manufacture of the gas had not yet, however, been placed on a commercial basis.

SO MANY COMPLAINTS are now being made in the United States as to the quality of German chemicals and so many cases are pending in the German courts between concerns on account of chemicals not coming up to specifications that it has driven the American buyer to other markets. The impurities in Epsom salts and glauber salts shipped from Germany are such that they do not come near the U.S.P. specifications, although the German analyst assures the buyer that the product will meet them. The older firms, however, are still being careful in all dealings in order to uphold the reputation of their houses. One American firm dumped 50 tons of Epsom salts into the river after their arrival, due to the fact that they contained such a large percentage of impurities.

IT WAS ANNOUNCED at the joint conference on corrosion problems, held at Sheffield University last week, that a new tarnish-resisting alloy, which is in reality "stainless silver," had been prepared. The invention is the result of research conducted by Mr. Harold Turner, of Messrs. William Turner and Co., gold and silver refiners, Eyre Street, Sheffield, in association with Mr. W. G. N. Boyd, the firm's works chemist, and "Silanca," as it is called, is now on the market as a finished product. Mr. Turner exhibited a number of articles made with the new silver, some of which had been exposed to the atmosphere for two years, and showed no signs of tarnishing. Although a silver alloy, owing to the low percentage of alloy in the material, the new metal is technically sterling silver, and carries the hall-mark.

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Patent Literature

Abstracts of Complete Specifications

194,740. Synthetic Production of Ammonia, Process for. L. Casale, 9, Via del Parlamento, Rome. Application date, September 19, 1921.

In the usual process for the synthetic production of ammonia a mixture of nitrogen and hydrogen is continuously passed over a catalyst at a pressure of about 200 atmospheres, and the ammonia produced is removed at each cycle. For this purpose the reaction gases must be reduced to about 50° C. which involves an expensive cooling plant, or, alternatively, the ammonia may be dissolved in water under pressure, but the commercial value of the aqueous solution is smaller. These difficulties may be partly avoided by increasing the pressure at which the synthesis takes place to 500 atmospheres, but in this case the exothermic reaction is liable to cause excessive heating of the catalyst with resulting loss of efficiency. In the present invention, the danger of spontaneous heating of the catalyst is avoided by removing only a part of the ammonia at each cycle, so that the reacting gases always contain an appreciable quantity of ammonia. The formation of ammonia is reduced in the hottest part of the catalyst, and the specific heat of the reaction mixture is also greater.

194,804. New Fat and Oil Splitting Reagents, Manufacture of—and their application to a process for Splitting Fats and Oils into Glycerine and Fatty Acids. A. Rayner, and Price's Patent Candle Co., Ltd., Belmont Works, Battersea, London, S.W.11. Application date, December 20, 1921.

In the usual methods of fat-splitting in which hydrolysis is effected by catalytic quantities of sulphonic acids, the sulphonic acids used are usually produced from aromatic hydrocarbons, or acid sludges from the refining of crude mineral oils. In this invention the object is to obtain the sulphonic acids from material normally produced in fat-splitting works. In the process of distillation the unsaponified fatty matter and non-saponifiable alcohols, cholesterol, etc., remain in the still, and in the final stage of distillation a dark, viscous distillate is obtained, consisting of hydrocarbons, oxyhydrocarbons and polymerised acids. This viscous distillate is then treated with sulphuric acid to yield the fat-splitting sulphonic acids required. In an example, the viscous distillate, containing 30-60 per cent. of free fatty acid calculated as oleic acid, is agitated with twice its weight of sulphuric acid at 180° F., and then run into a small volume of water and agitated. The upper layer consists of a complex mixture of sulphonic acids, which may be used for splitting oils and fats to convert them into fatty acids and glycerine. The oil or fat to be treated is first agitated with 1-2 per cent. of sulphuric acid at 160°–180° F. to clean it, and is then boiled with a mixture of water containing 1-2 per cent. of sulphuric acid, and 1-2 per cent of the splitting reagent. The glycerine resulting from the hydrolysis is particularly free from soluble sulphonic acids. The fatty acids may then be distilled to purify them, yielding a further quantity of the by-product from which the splitting reagent is obtained.

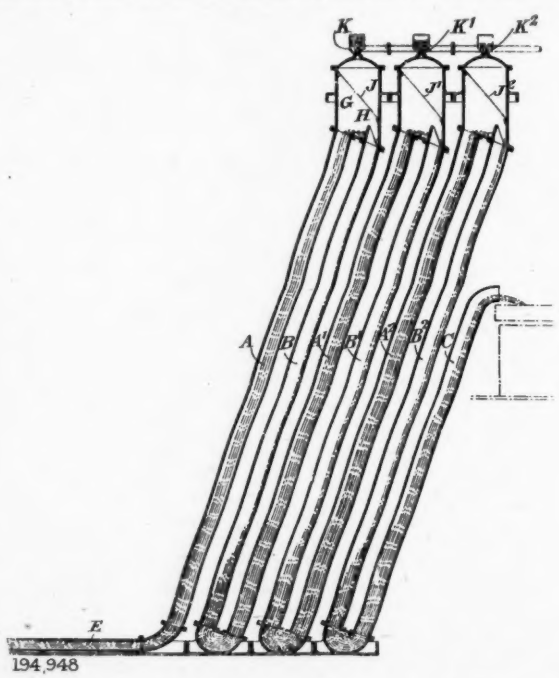
194,815. Tanning, Process of—and Manufacture of Tanning Reagents. W. Moeller, 20, Bilhorner-Kanalstrasse, Hamburg 27, Germany. Application date, December 21, 1921.

These tanning agents consist of aldehydes which contain a sulphur atom instead of the oxygen atom, or in polymerised forms several sulphur atoms instead of the oxygen atoms. These thio-aldehydes are produced by treating an ordinary aldehyde acidified with strong hydrochloric acid, with hydrogen sulphide. In the case of formaldehyde solution, a saturated solution of sodium thiosulphate is added, and the mixture gradually acidified with concentrated sulphuric acid. Polymerides are produced as well as a simple thioaldehyde; thus, in the case of acetaldehyde, trimethyl-trithioaldehyde is obtained. Other tanning agents may be obtained by the oxidation of a thioaldehyde, which yields a sulphone. Suitable oxidising agents for this purpose are acidified solutions of potassium bichromate, nitric acid, ozone, percarbonates or halogens. The tanning agent need not be separated from the mixture, which may be used directly for tanning after neutralising the acid, or the tanning agent may be produced in contact with the hide. In an example, 1 part of formaldehyde solution is mixed with 2-3 parts of concentrated hydrochloric acid, heated on a water-bath, and hydrogen sulphide passed through. The product is a milky colloidal solution, which is then neutralised with the sodium carbonate and used as the tanning agent. The production of the thioaldehyde may be obtained in a similar manner by means of sodium thiosulphate solution and hydrochloric acid.

Another example is given in which the thio-aldehyde is oxidised by means of sodium bichromate. Other known tanning agents may be obtained by condensing aldehydes with phenols or aromatic hydrocarbons and sulphonating the products. In this invention, thio-aldehydes or trisulphones may be substituted for the ordinary aldehydes in any such process. It is not necessary that the pure thio-aldehydes should be isolated. In an example, a thio-aldehyde is condensed with crude cresol at 130°–140° C., in an autoclave, and the resinous product is then separated and dissolved in strong sulphuric acid to obtain the tanning agent. In another example, a homologue of thio-formaldehyde may be obtained by saturating hexamethylene-tetramine with hydrogen sulphide. The solution may be treated directly with phenol or hydrocarbon to obtain the tanning agent. The acid in the sulphonation product may be neutralised with alkalies, amines, amino bases, ammonia or ammonium bases, alkali sulphide, poly-sulphide or hydro-sulphide.

194,948. Clarification of Sugar and other Juices, Solutions, or the like, Apparatus for. Duncan Stewart and Co., Ltd., London Road Iron Works, Glasgow. From W. Mauss, 69, Cullinan Buildings, Main and Simmonds Street, Johannesburg, South Africa. Application date, April 3, 1922.

The apparatus is for the clarification of sugar and other juices, solutions, etc., containing albumen or other substance which is coagulated by heat, and the object is to obtain the necessary gradual reduction of temperature and pressure in the final process without breaking up the particles of coagulated



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albumen. The apparatus consists of a series of units, each comprising a pair of tubes inclined at an angle to the vertical. Steam and vapour released from the rising column tends to travel along the upper side of the tube, and the liquid delivered

(*Continued on page* 433.)

at the top into the upper end of the down-flow tube tends to flow along the lower side of the tube. The heated liquid is supplied under pressure through a pipe E to the first rising pipe A, and is discharged at the top into a vessel G. The liquid then flows over a weir H into the down-flow pipe B, which is connected at the bottom to a similar pair of pipes A^1, B^1, the latter being connected in series to a third pair of pipes A^2, B^2. Steam and vapour pass through perforated plates J, J^1, J^2, and then through relief valves K, K^1, K^2, which are weight-loaded to the required pressure. The clarified liquid is finally discharged through a rising pipe C.

194,840. Dyeing of Cellulose Acetates. R. Clavel, Basel-Augst, Switzerland. Application date, January 5, 1922.

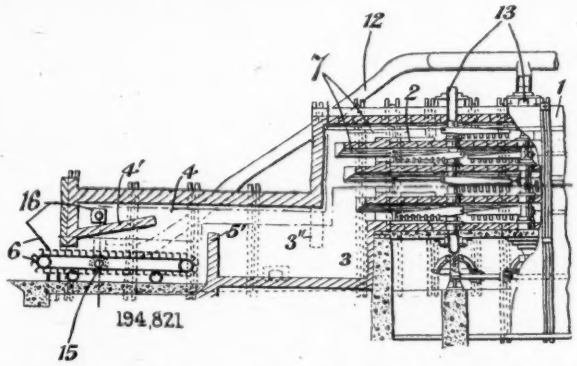
The process is for dyeing cellulose acetate products black, and imparting to the dyestuffs an increased affinity for cellulose acetate. Specification No. 182,830 (see The Chemical Age, Vol. VII., p. 246) shows that certain groups in dyestuffs are capable of imparting to the dyestuffs an increased affinity for cellulose acetate, *e.g.*, in the case of aniline black. According to the present process, diphenyl black base (para-aminodiphenylamine), which contains two active groups, may be employed for dyeing cellulose acetate products by development. Similar results are obtained by this process without the equipment necessary for aniline black dyeing. In an example, two stock solutions are prepared: (1) diphenyl black base, lactic acid, acetic acid, and water; (2) aluminium chloride, chromium chloride, cupric chloride, sodium chlorate, and water, and the dyeing bath comprises equal parts of the two solutions. The dyeing is effected by soaking at ordinary temperature, and then oxidising or developing by drying at 80° C. The dyed products are then washed twice, soaked at 50°–60° C., and then rinsed. Detailed examples of the process are given.

195,026. Separating or Isolating Organic Gases or Vapours of Organic Products, Process for. Farbenfabriken vorm. F. Bayer and Co., Leverkusen, near Cologne, Germany, and A. Engelhardt, 19, Kaiserstrasse, Niederrhein, Wiesdorf, Germany. Application date, September 16, 1921.

Specification No. 156,543 (see The Chemical Age, Vol. IV., p. 376) describes a process for separating organic gases or vapours from a mixture with air or other gases, such as hydrogen, by absorbing the organic compounds in active porous charcoal, and then separating the absorbed organic compound from the charcoal. In the present invention the absorbed gas is released from the charcoal by means of a superheated organic vapour, which may be the same as the compound to be removed. Substances such as ether, methylchloride or methylformic ester may be recovered in this manner, and in these cases the highest temperature at which the superheated vapour is absorbed by the charcoal is considerably below the temperature which would be necessary if superheated steam were used to recover the absorbed product. The heat required in the present process is therefore less.

194,821. Roasting Furnaces. A. V. Leggo, 497, Collins Street, Melbourne, Australia. Application date, December 23, 1921.

The roasting furnace is of the multiple, independent hearth type, and the object is to supply the hot gases to the different roasting chambers under uniform conditions, so that the ore passing over all the hearths may be subjected to the same roasting conditions. For this purpose, the roasting gases are passed at controllable pressure through an equalising chamber interposed between the source of the gas supply and the roasting chambers. The furnace 1 is composed of a number of superimposed independent hearths 2, which extend from the inlet end to the equalising chamber 3. The discharge ends of the hearths project into the equalising chamber to an extent which increases from the lower hearth upwards. The gas inlet to the various roasting chambers thus varies in size in such a manner that the draught through these chambers induces the proper flow of gas. The projecting ends of the hearths also act as deflectors for the hot gases. The chamber 3 communicates with the combustion chamber 4 of a fire box provided with a mechanical stoker 6. A deflecting baffle 4^1 is provided in the combustion chamber, to facilitate the ignition of the fuel and deflect the combustion gases towards the equalising chamber. The opposite ends of the roasting chamber 7 are provided with separate valves or dampers to regulate the draught through them. The draught may be produced by means of a fan which draws heated air through the hollow rabble shafts 13 arranged in the hotter part of the furnace, and delivers it through a pipe 12 to inlets 15, 16, arranged below the grate and in the combustion chamber respectively. The gases in the chamber 3 are mixed, and their temperature equalised, by means of baffles 5^1, 3^{11}. The temperature and oxygen content of the gases in the chamber



3 may be varied by regulating the air supply above and below the grate. The furnace thus enables the temperature, oxygen content, rate of flow, and pressure to be varied independently so that the best metallurgical results may be obtained. The ore is carried over the hearth to the discharge end by means of rotating rabbles arranged on vertical shafts at intervals. A special construction of rabble device is also described for obtaining an even distribution of the ore and preventing any caking or setting of the ore.

Note.—Abstracts of the following specifications, which are now accepted, appeared in The Chemical Age when they became open to inspection under the International Convention:—172,962 (Naamlooze Vennootschap Algemeene Norit Maatschappij) relating to treating liquids with decolourising, purifying and filtering agents, and separating undissolved substances from liquids, see Vol. VI., p. 210; 174,086 (Gulf Refining Co.) relating to the cracking of hydrocarbon oils, coal tar, and the like, see Vol. VI., p. 396; 174,336 (Trent Process Corporation) relating to distilling materials, having an oil-producing content, see Vol. VI., p. 396; 181,677 (G. A. Blanc), relating to treating silicates with acids to obtain solutions of salts free from silica, see Vol. VII., p. 321; 188,338 (Kinzlberger and Co.), relating to the preparation of iron-free chromium compounds, see Vol. VIII., p. 15; 191,357 (E. Schmidt), relating to obtaining cellulose from wood, etc., see Vol. VIII., p. 268

International Specifications not yet Accepted

192,994. Dyeing Cellulose Acetate. Soc. Chimique des Usimes du Rhône, 21, Rue Jean-Goujon, Paris. International Convention date, February 10, 1922. Addition to 150,989.

Products formed from cellulose acetate are treated to render them more receptive to dyes by surface saponification. The treating bath consists of a cold or hot concentrated solution of a neutral alkali metal salt and a salt having an alkaline reaction. A mixture of sodium sulphate and sodium carbonate, heated gradually to 85° C. may be used. The amount of the alkaline salt should be less than the equivalent of a one per cent. solution.

193,012. Treating Ores. Allmänna Ingeniörsbyran, H. G. Torulf, 11, Blasicholmstorg, Stockholm. International Convention date, February 8, 1922.

Ores are sintered by drawing air downwards through an ignited charge of ore and fuel. The charge is arranged in superposed layers, with different proportions of fuel, the proportion being highest at the top.

193,029. Purifying Oils. A. Rialland, 8, Rue de l'Aigle, La Garenne-Colombes, Seine, France. International Convention date, February 7, 1922.

To remove tar from mineral oil, the oil is stirred with water and then with sulphuric acid of 66° Bé., which may contain

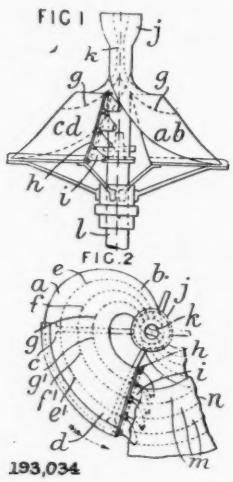
fuming sulphuric acid. The oil is decanted and centrifuged, and then washed with alkali and again centrifuged.

193,030. SEPARATING LIQUIDS BY DISTILLATION. A. J. M. Rialland, 8, Rue de l'Aigle, La Garenne-Colombes, Seine, France. International Convention date, February 7, 1922.

A mixture of liquids is atomised into a gas or into the vapour of a liquid which is not miscible with the mixture to be separated. The gas containing the atomised liquid is passed through a tube surrounded by steam jackets. The steam passes through the jackets in series, expanding from one to the next, so that the temperature decreases from one end of the tube to the other. The different fractions of the mixture are separated by condensation in different parts of the tube.

193,034. CENTRIFUGAL SEPARATORS. F. Radelet, 41, Rue Royale, Brussels. (Assignee of G. Pinoche, Cousancelles, Meuse, France.) International Convention date, February 8, 1922.

A rotating vertical spindle *l* carries one or more sheaths, each having a helical truncated part *ab* terminating in a conical truncated part *cd*. The conduits thus formed are divided into a number of channels by internal partitions *e*, *f*, *g* and e^1, f^1, g^1, which do not extend completely across the sheath, or are



193,034

perforated for the passage of solids. The mixture to be separated is fed through the inlet *k* to the part *ab* and water is fed through the inlet *j*. The rib *g* prevents access of water to the mixture until it reaches the part *cd*, and the mixture is then graded by means of the perforations in the partitions. The discharge end of the part *cd* is closed by a plate *h* having nozzles *i* through which the graded materials are discharged into channels *m*.

193,057. EXTRACTING METALS AND ALLOYS. D. W. Berlin, Rasunda, Sweden. International Convention date, February 11, 1922.

Chromium or tungsten ores or oxides are mixed with suitable fluxes and are briquetted by means of a binder such as water glass. The ore is reduced to the metal by means of a bath of molten alloy of silicon with aluminium, iron, chromium or manganese, yielding an alloy with the reduced metal. Slag is removed, and fresh ore added periodically.

LATEST NOTIFICATIONS.

195,600. Manufacture of azo-dyestuffs. Farbwerke vorm. Meister, Lucius, and Brüning. April 1, 1922.

195,602. Manufacture of hexamethylenetetramine. Holzverkohlungs Industrie Akt.-Ges. March 28, 1922.

195,619. Process for the manufacture of a cellulose compound indifferent to substantive colours. Textilwerk Horn Akt.-Ges. April 3, 1922.

195,625. Process for coating aluminium and the product produced thereby. Aluminium Co. of America. April 3, 1922.

195,649. Manufacture of new azo-dyes. Farbenfabriken vorm. F. Bayer and Co. April 3, 1922.

Specifications Accepted, with Date of Application

183,117. Zinc from complex ores, Electrolytic process of recovering. J. T. Ellsworth. July 12, 1921.

195,417. Mond gas process, Method for the recovery of the sensible heat of gases in. H. R. Trenkler. October 29, 1921.

195,422. Low boiling-point oil from a relatively higher boiling-point oil or fraction Method of producing. R. W. Hanna. November 21, 1921.

195,463. Pigments or paints, Manufacture of. T. Hughes. January 3, 1922.

195,467. Separating the liquid and solid components of mixtures of liquids and crushed or ground ore products, Apparatus for. A. J. Arbuckle. January 9, 1922.

195,497. Softening wood. J. Y. Johnson. (*Badische Anilin und Soda Fabrik.*) February 14, 1922.

195,513. Dyestuffs, Manufacture of intermediate products for. O. Y. Imray. (*Soc. of Chemical Industry in Basle.*) March 18, 1922. Addition to 172,177.

195,556. Gold and silver-bearing antimony ores, Process for the treatment of. Z. Metzl. June 16, 1922.

195,559. Plastic compositions. British Thomson-Houston Co., Ltd. (*General Electric Co.*) June 20, 1922.

195,560. Centrifugal separators and the like. W. Mauss. June 26, 1922.

195,569. Viscose, Processes for manufacturing—with a view to the manufacture of artificial silk and like products not liable to lose their resistance by contact with water. H. Delahaye. August 31, 1922.

Applications for Patents

Ans, J. d', and Chemische Werke vorm. Auerges. Process for oxidising organic substances in alkaline liquors. 9478. April 6.

Badische Anilin and Soda Fabrik, and Johnson, J. Y. Dyeing cellulose esters. 9324. April 5.

Bakelite Ges. and Hessen, R. Manufacture of condensation products from phenols and aldehydes. 9522. April 6. (Germany, November 4, 1922.)

Brünner Ges. Geb. and Reitmayer, K. Continuous distillation of wood. 9514. April 6.

Casale, L. Synthetic production of ammonia. 9405. April 5. (Italy, May 13, 1922.)

Dicker, S. G. S., and S. E. Co. Distillation of shale, etc. 9181. April 3.

Farbenfabriken vorm. F. Bayer and Co. Manufacture of azo-dyes. 9161. April 3. (Germany, April 3, 1922.)

Farbwerke vorm. Meister, Lucius, and Brüning. Converting hydrocarbons, etc., into others containing a higher number of carbon atoms. 9374. April 5. (Germany, April 15, 1922.)

Naugutuck Chemical Co. Manufacture of diphenylguanidine. 9369. April 5. (United States, June 19, 1922.)

South Metropolitan Gas Co. Fuels containing carbonized products. 9506. April 6.

Thermal Industrial and Chemical (T.I.C.) Research Co., Ltd. Heating liquids by introduction into molten metal. 9599. April 7.

The Training of Colour Makers

PROFESSOR ARTHUR G. PERKIN, F.R.S., the head of the Departments of Colour Chemistry and Dyeing at Leeds University, where the summer term opened on Thursday, in a statement on the effect upon the career of university men of new conditions in the dyestuffs industry, says: "Although the number of students entering our Colour Chemistry and Dyeing Department is falling, it still remains much higher than at any time before the war. A decrease to some extent is inevitable because, in the first place, many ex-army men have now finished their training, and, at the same time, fees have of necessity been considerably increased. This, I am afraid, may prevent many young men from taking our course. In the future we may have a normal sixty students taking our three years' course either for the Diploma or Ordinary B.Sc. in dyeing, or our four years' course leading to the Honours B.Sc. in colour chemistry. In this case some twenty students will enter the dyeing, colour chemistry, and allied industries each year. Much, however, depends upon Government action, for, if they repeal the Dyestuffs Act, there is no doubt that the artificial dyes industry will become moribund in this country. As it is, the forty-seven students who left me this year have all obtained positions not only in colour works, but in wool dyeing, cotton dyeing, calico printing, artificial silk, and other industries."

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

London, April 18, 1923.

TRADE has been fairly satisfactory during the current week, and orders have been numerous.

Prices in the main are steady, with an upward tendency in many cases.

Export inquiry has been very active, although some of the limits are not workable.

General Chemicals

ACETONE continues scarce and firm.

ACID ACETIC maintains its position, and is very scarce on the spot.

ACID CITRIC is firmer and in active request.

ACID FORMIC continues scarce, with only a small amount offering from abroad.

ACID LACTIC has been more active, and the price is very firm.

ACID OXALIC is a shade easier and in moderate demand.

ACID TARTARIC has further advanced and some good business has been placed for forward.

ARSENIC is without change, and values are strongly maintained both for prompt and forward position.

BARIUM CHLORIDE is moderately active and the price is maintained.

FORMALDEHYDE only in small demand, but the price is firm and stocks light.

LEAD ACETATE has further advanced and in good demand.

LITHOPONE has been more active at last quoted figures.

METHYL ALCOHOL is on offer at full figures.

POTASSIUM CARBONATE has advanced a little and is in short supply.

POTASSIUM PERMANGANATE is still firmer, with little supplies available.

POTASSIUM PRUSSIATE has declined in price and the English manufacture now competes with imported; the demand is much better.

SODIUM ACETATE is scarce and firm and value unchanged.

SODIUM BICHROMATE is unchanged and price firm.

SODIUM HYPOSULPHITE has been a bright spot, and English makers are well occupied at current figures.

SODIUM NITRITE has been in better demand without change in value.

SODIUM PRUSSIATE is very easy, mainly owing to the absence of export demand.

SODIUM SULPHIDE is idle, with price nominally unchanged.

ZINC OXIDE is extremely firm and in short supply.

ZINC SULPHATE steady.

Pharmaceutical Chemicals

ACETYL SALICYLIC ACID remains a firm market, although not so active as of late.

ACETANILID is unchanged. Some holders are, however, asking higher prices.

BARBITONE is very scarce and higher on the week.

BROMIDES.—Prices tend upward. The Continental situation is exceedingly firm.

METHYL SALICYLATE is in good demand, stocks being firmly held.

MILK SUGAR.—A steady business is reported. Some holders seem inclined to cut the price slightly, but the best brands hold their own. Many parcels of Continental make are distinctly coarse in texture and of poor colour.

PHENACETIC is sold steadily. Higher prices are expected.

PHENAZONE has advanced again.

VANILLIN.—Unchanged.

Coal Tar Intermediates

Business on Home account has been about average, but a fair number of inquiries have been received for export, and this market continues interesting.

ALPHA NAPHTHOL.—Stocks remain short and price is firm.

ALPHA NAPHTHYLAMINE.—Some fair export inquiries are in the market.

ANILINE OIL.—Foreign buyers are interested, but little actual business is reported.

BENZALDEHYDE.—Some few inquiries have been received.

BENZIDINE BASE.—Stocks of first class material seem to be fairly short, but this product is firm.

BETA NAPHTHOL.—The price is unchanged and export inquiries have been received.

DIMETHYLANILINE continues firm at last quoted price.

DINITROPHENOL.—Some home trade is reported.

"H" ACID is without special feature.

MONO CHLOR BENZOL.—Some export inquiry.

NAPHTHIONATE OF SODA.—A few home trade orders have been received, and foreign buyers are also interested.

NITRO BENZOL.—Rather more business is reported.

PARANITRANILINE is rather quiet.

PHTHALIC ANHYDRIDE.—Export inquiries for fair quantities have been received.

"R" SALT is featureless.

Coal Tar Products

There is little change in the price of coal tar products from last week.

90% BENZOL remains stationary at 1s. 7d. to 1s. 8d. per gallon on rails.

PURE BENZOL has no great demand, and is quoted at 2s. 1d. per gallon on rails in the North, and 2s. 4d. to 2s. 5d. per gallon in the South.

CREOSOTE OIL is steady at 8¾d. to 9d. per gallon in the Midlands and North, and 9¼d. to 9¾d. per gallon in the South.

CRESYLIC ACID has no great demand, the pale quality, 97/99%, being worth about 2s. 1d. to 2s. 2d. per gallon on rails, while the dark quality, 95/97%, is quoted at 1s. 10d. per gallon.

SOLVENT NAPHTHA is uninteresting at 1s. 4d. per gallon, on rails.

HEAVY NAPHTHA has also a poor inquiry at 1s. 5d. per gallon on rails.

NAPHTHALENES maintain their strong position, and the lower melting points are worth from £10 to £12 per ton, while the hot pressed quality is quoted at £14 per ton.

PITCH is dull, and orders are scarce. To-day's quotations are: 195s. to 200s., f.o.b., London; 190s. to 195s., f.o.b., East Coast.

Sulphate of Ammonia

SULPHATE OF AMMONIA.—The home trade season is practically at an end, but the demand for export remains satisfactory. The value for May shipment is about £17 per ton, f.o.b.

[*Current Market Prices on following pages.*]

The Manufacture of Insulin

BURROUGHS WELLCOME AND CO., Snow Hill, London, E.C.1, announce that under licence of the Medical Research Council they are manufacturing and issuing "Wellcome" Brand Insulin for the treatment of diabetes. "At a meeting," they add, "of all the London licensees with the Medical Research Council on Friday, April 6, a suggestion was discussed that the Medical Research Council should issue an official announcement with regard to present supplies of Insulin of British manufacture, and intimate that arrangements have also been made for the distribution of temporary supplies of Insulin of American origin. In order to give the Medical Research Council an opportunity of making this official announcement, Burroughs Wellcome and Co. have, until now, deferred communicating to the Press that supplies of their own manufacture have been issued. "Wellcome" Brand Insulin is manufactured throughout by Messrs. Burroughs Wellcome and Co., who are not acting in association with any other firm."

Current Market Prices

General Chemicals

	Per	£	s.	d.		£	s.	d.
Acetic anhydride	lb.	0	1	7	to	0	1	9
Acetone oil	ton	90	0	0	to	95	0	0
Acetone, pure	ton	130	0	0	to	135	0	0
Acid, Acetic, glacial, 99–100%	ton	69	0	0	to	70	0	0
Acetic, 80% pure	ton	48	0	0	to	50	0	0
Acetic, 40% pure	ton	25	0	0	to	26	0	0
Arsenic, liquid, 2000 s.g.	ton	100	0	0	to	105	0	0
Boric, cryst.	ton	55	0	0	to	60	0	0
Carbolic, cryst. 39–40%	lb.	0	1	8	to	0	1	9
Citric	lb.	0	1	10	to	0	1	10½
Formic, 80%	ton	52	10	0	to	53	0	0
Hydrofluoric	lb.	0	0	7½	to	0	0	8½
Lactic, 50 vol.	ton	41	0	0	to	43	0	0
Lactic, 60 vol.	ton	43	0	0	to	44	0	0
Nitric, 80 Tw.	ton	27	0	0	to	28	0	0
Oxalic	lb.	0	0	6¾	to	0	0	7
Phosphoric, 1.5	ton	40	0	0	to	42	0	0
Pyrogallic, cryst.	lb.	0	5	9	to	0	6	0
Salicylic, Technical	lb.	0	1	9	to	0	2	0
Sulphuric, 92–93%	ton	6	0	0	to	7	0	0
Tannic, commercial	lb.	0	2	3	to	0	2	9
Tartaric	lb.	0	1	5	to	0	1	5½
Alum, lump	ton	12	10	0	to	13	0	0
Chrome	ton	28	0	0	to	29	0	0
Alumino ferric	ton	9	0	0	to	9	5	0
Aluminium, sulphate, 14–15%	ton	8	10	0	to	9	0	0
Sulphate, 17–18%	ton	10	10	0	to	11	0	0
Ammonia, anhydrous	lb.	0	1	6	to	0	1	8
.880	ton	32	0	0	to	34	0	0
.920	ton	22	0	0	to	24	0	0
Carbonate	lb.	0	0	4	to	0	0	4¼
Chloride	ton	50	0	0	to	55	0	0
Muriate (galvanisers)	ton	35	0	0	to	37	10	0
Nitrate (pure)	ton	35	0	0	to	40	0	0
Phosphate	ton	68	0	0	to	70	0	0
Sulphocyanide, commercial 90%	lb.	0	1	1	to	0	1	3
Amyl acetate	ton	175	0	0	to	185	0	0
Arsenic, white powdered	ton	70	0	0	to	75	0	0
Barium, carbonate, Witherite	ton	5	0	0	to	6	0	0
Carbonate, Precip.	ton	15	0	0	to	16	0	0
Chlorate	ton	65	0	0	to	70	0	0
Chloride	ton	17	0	0	to	17	10	0
Nitrate	ton	33	0	0	to	35	0	0
Sulphate, blanc fixe, dry	ton	20	10	0	to	21	0	0
Sulphate, blanc fixe, pulp	ton	10	5	0	to	10	10	0
Sulphocyanide, 95%	lb.	0	1	0	to	0	1	1
Bleaching powder, 35–37%	ton	10	10	0	to	11	0	0
Borax crystals	ton	28	0	0	to	32	0	0
Calcium acetate, Brown	ton	11	10	0	to	12	0	0
Grey	ton	19	15	0	to	20	0	0
Carbide	ton	16	0	0	to	17	0	0
Chloride	ton	6	0	0	to	7	0	0
Carbon bisulphide	ton	35	0	0	to	40	0	0
Casein technical	ton	100	0	0	to	105	0	0
Cerium oxalate	lb.	0	3	0	to	0	3	6
Chromium acetate	lb.	0	1	1	to	0	1	3
Cobalt acetate	lb.	0	6	0	to	0	6	6
Oxide, black	lb.	0	9	6	to	0	10	0
Copper chloride	lb.	0	1	2	to	0	1	3
Sulphate	ton	27	0	0	to	28	0	0
Cream Tartar, 98–100%	ton	90	0	0	to	92	10	0
Epsom salts (*see* Magnesium sulphate)								
Formaldehyde, 40% vol.	ton	90	0	0	to	92	10	0
Formusol (Rongalite)	lb.	0	2	1	to	0	2	2
Glauber slats, commercial	ton	5	0	0	to	5	10	0
Glycerin crude	ton	65	0	0	to	67	10	0
Hydrogen peroxide, 12 vols.	gal	0	2	2	to	0	2	3
Iron perchloride	ton	28	0	0	to	30	0	0
Sulphate (Copperas)	ton	3	10	0	to	4	0	0
Lead acetate, white	ton	43	0	0	to	45	0	0
Carbonate (White Lead)	ton	45	0	0	to	48	0	0
Nitrate	ton	44	10	0	to	45	0	0
Litharge	ton	45	0	0	to	46	0	0
Lithophone, 30%	ton	22	10	0	to	23	0	0
Magnesium chloride	ton	5	10	0	to	6	0	0
Carbonate, light	cwt.	2	10	0	to	2	15	0
Sulphate (Epsom salts commercial)	ton	6	10	0	to	7	0	0
Sulphate (Druggists')	ton	10	0	0	to	11	0	0
Manganese Borate, commercial	ton	65	0	0	to	75	0	0
Sulphate	ton	58	0	0	to	60	0	0
Methyl acetone	ton	71	0	0	to	75	0	0
Alcohol, 1% acetone	ton	105	0	0	to	110	0	0
Nickel sulphate, single salt	ton	41	0	0	to	42	0	0
Ammonium sulphate, double salt	ton	41	0	0	to	42	0	0
Potash, Caustic	ton	33	0	0	to	34	0	0
Potassium bichromate	lb.	0	0	5¾	to	0	0	6
Carbonate, 90%	ton	31	0	0	to	32	0	0
Chloride, 80%	ton	9	10	0	to	10	10	0
Chlorate	lb.	0	0	4¼	to	0	0	4½
Metabisulphite, 50–52%	ton	80	0	0	to	85	0	0
Nitrate, refined	ton	43	0	0	to	45	0	0
Permanganate	lb.	0	0	10	to	0	0	10½
Prussiate, red	lb.	0	4	3	to	0	4	4
Prussiate, yellow	lb.	0	1	5	to	0	1	5½
Sulphate, 90%	ton	10	10	0	to	11	0	0
Salammoniac, firsts	cwt.	3	3	0	to	—		
Seconds	cwt.	3	0	0	to	—		
Sodium acetate	ton	24	15	0	to	25	0	0
Arsenate, 45%	ton	48	0	0	to	50	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	4½	to	0	0	4¾
Bisulphite, 60–62%	ton	21	0	0	to	23	0	0
Chlorate	lb.	0	0	3½	to	0	0	3¾
Caustic, 70%	ton	19	10	0	to	20	0	0
Caustic, 76%	ton	20	10	0	to	21	0	0
Hydrosulphite, powder	lb.	0	1	5	to	0	1	6
Hyposulphite, commercial	ton	10	10	0	to	11	0	0
Nitrite, 96–98%	ton	28	0	0	to	29	0	0
Phosphate, crystal	ton	16	0	0	to	16	10	0
Perborate	lb.	0	1	0	to	0	1	1
Prussiate	lb.	0	0	9	to	0	0	9¼
Sulphide, crystals	ton	10	10	0	to	11	0	0
Sulphide, solid, 60–62 %	ton	16	10	0	to	17	10	0
Sulphite, cryst.	ton	12	10	0	to	13	0	0
Strontium carbonate	ton	50	0	0	to	55	0	0
Nitrate	ton	40	0	0	to	42	0	0
Sulphate, white	ton	6	10	0	to	7	10	0
Sulphur chloride	ton	25	0	0	to	27	10	0
Flowers	ton	11	10	0	to	12	10	0
Roll	ton	11	0	0	to	12	0	0
Tartar emetic	lb.	0	1	2	to	0	1	3
Tin perchloride, 33%	lb.	0	1	2	to	0	1	4
Perchloride, solid	lb.	0	1	5	to	0	1	7
Protochloride (tin crystals)	lb.	0	1	4	to	0	1	5
Zinc chloride 102° Tw.	ton	21	0	0	to	22	10	0
Chloride, solid, 96–98%	ton	25	0	0	to	30	0	0
Oxide, 99%	ton	40	0	0	to	42	0	0
Dust, 90%	ton	45	0	0	to	47	10	0
Sulphate	ton	16	0	0	to	17	0	0

Pharmaceutical Chemicals

Acetyl salicylic acid	lb.	0	3	3	to	0	3	6
Acetanilid	lb.	0	1	6	to	0	1	9
Acid, Gallic, pure	lb.	0	3	0	to	0	3	3
Lactic, 1.21	lb.	0	2	9	to	0	3	0
Salicylic, B.P.	lb.	0	2	2	to	0	2	6
Tannic, leviss	lb.	0	3	4	to	0	3	6
Amidol	lb.	0	8	6	to	0	8	9
Amidopyrin	lb.	0	13	3	to	0	13	6
Ammon ichthosulphonate	lb.	0	2	0	to	0	2	3
Barbitone	lb.	0	18	0	to	0	18	6
Beta naphthol resublimed	lb.	0	1	9	to	0	2	0
Bromide of ammonia	lb.	0	0	8½	to	0	0	9½
Potash	lb.	0	0	8	to	0	0	9
Soda	lb.	0	0	8½	to	0	0	9½
Caffeine, pure	lb.	0	12	0	to	0	12	3
Calcium glycerophosphate	lb.	0	5	9	to	0	6	0
Lactate	lb.	0	2	0	to	0	2	3
Calomel	lb.	0	4	9	to	0	5	0
Chloral hydrate	lb.	0	4	0	to	0	4	3
Cocaine alkaloid	oz.	0	18	0	to	0	18	6
Hydrochloride	oz.	0	14	9	to	0	15	0
Corrosive sublimate	lb.	0	4	3	to	0	4	6
Eucalyptus oil, B.P. (70–75% eucalyptol)	lb.	0	1	6	to	0	1	6½
B.P. (75–80% eucalyptol)	lb.	0	1	7	to	0	1	7½
Guaiacol carbonate	lb.	0	8	3	to	0	8	6
Liquid	lb.	0	9	6	to	0	10	0
Pure crystals	lb.	0	10	6	to	0	10	9
Hexamine	lb.	0	4	3	to	0	4	6
Hydroquinone	lb.	0	3	9	to	0	4	0
Lanoline anhydrous	lb.	0	0	7	to	0	0	7½
Lecithin ex ovo	lb.	0	18	6	to	1	0	0
Lithi carbonate	lb.	0	9	6	to	0	10	0
Methyl salicylate	lb.	0	2	6	to	0	2	9
Metol	lb.	0	9	6	to	0	10	0
Milk sugar	cwt.	4	15	0	to	5	0	0
Paraldehyde	lb.	0	1	6	to	0	1	9
Phenacetin	lb.	0	5	9	to	0	6	3
Phenazone	lb.	0	7	9	to	0	8	0
Phenolphthalein	lb.	0	5	3	to	0	5	6
Potassium sulpho guaiacolate	lb.	0	5	0	to	0	5	3
Quinine sulphate, B.P.	oz.	0	2	3		—		

	Per	£	s.	d.		£	s.	d.
Resorcine, medicinal	lb.	0	5	3	to	0	5	6
Salicylate of soda powder	lb.	0	2	6	to	0	2	9
Crystals	lb.	0	2	9	to	0	3	0
Salol	lb.	0	2	9	to	0	3	0
Soda Benzoate	lb.	0	2	3	to	0	2	6
Sulphonal	lb.	0	14	0	to	0	14	6
Terpene hydrate	lb.	0	1	9	to	0	2	0
Theobromine, pure	lb.	0	12	0	to	0	12	6
Soda salicylate	lb.	0	7	9	to	0	8	3
Vanillin	lb.	1	3	6	to	1	4	6

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	2	0	to	0	2	3
Refined	lb.	0	2	6	to	0	2	9
Alphanaphthylamine	lb.	0	1	6	to	0	1	7
Aniline oil, drums extra	lb.	0	0	9½	to	0	0	10
Salts	lb.	0	0	9½	to	0	0	10
Anthracene, 40–50%	unit	0	0	8½	to	0	0	9
Benzaldehyde (free of chlorine)	lb.	0	3	0	to	0	3	3
Benzidine, base	lb.	0	5	0	to	0	5	3
Sulphate	lb.	0	3	9	to	0	4	0
Benzoic acid	lb.	0	2	0	to	0	2	3
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol	lb.	0	1	1	to	0	1	2
Betanaphthylamine, technical	lb.	0	4	0	to	0	4	3
Croceine Acid, 100% basis	lb.	0	3	3	to	0	3	6
Dichlorbenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	4	6	to	0	4	9
Dinitrobenzol	lb.	0	1	1	to	0	1	2
Dinitrochlorbenzol	lb.	0	0	11	to	0	1	0
Dinitronaphthalene	lb.	0	1	4	to	0	1	5
Dinitrotoluol	lb.	0	1	4	to	0	1	5
Dinitrophenol	lb.	0	1	7	to	0	1	9
Dimethylaniline	lb.	0	3	0	to	0	3	3
Diphenylamine	lb.	0	3	9	to	0	4	0
H-Acid	lb.	0	5	0	to	0	5	3
Metaphenylenediamine	lb.	0	4	0	to	0	4	3
Monochlorbenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	5	9	to	0	6	0
Metatoluylenediamine	lb.	0	4	0	to	0	4	3
Monosulphonic Acid (2.7)	lb.	0	5	6	to	0	6	0
Naphthionic acid, crude	lb.	0	2	3	to	0	2	6
Naphthionate of Soda	lb.	0	2	6	to	0	2	9
Naphthylamin-di-sulphonic-acid	lb.	0	4	0	to	0	4	3
Neville Winther Acid	lb.	0	7	3	to	0	7	9
Nitrobenzol	lb.	0	0	8	to	0	0	8
Nitronaphthalene	lb.	0	1	0	to	0	1	1
Nitrotoluol	lb.	0	0	8	to	0	0	9
Orthoamidophenol base	lb.	0	12	0	to	0	12	6
Orthodichlorbenzol	lb.	0	1	0	to	0	1	1
Orthotoluidine	lb.	0	0	10	to	0	0	11
Orthonitrotoluol	lb.	0	0	3	to	0	0	4
Para-amidophenol, base	lb.	0	8	6	to	0	9	0
Hydrochlor	lb.	0	7	6	to	0	8	0
Paradichlorbenzol	lb.	0	0	6	to	0	0	7
Paranitraniline	lb.	0	2	7	to	0	2	9
Paranitrophenol	lb.	0	2	3	to	0	2	6
Paranitrotoluol	lb.	0	2	9	to	0	3	0
Paraphenylenediamine, distilled	lb.	0	12	0	to	0	12	6
Paratoluidine	lb.	0	5	9	to	0	6	3
Phthalic anhydride	lb.	0	2	6	to	0	2	9
Resorcin, technical	lb.	0	4	0	to	0	4	3
Sulphanilic acid, crude	lb.	0	0	10	to	0	0	11
Tolidine, base	lb.	0	7	3	to	0	7	9
Mixture	lb.	0	2	6	to	0	2	9

Essential Oils and Synthetics

The market this week has been very quiet, with practically no business passing. There are no changes of any sort to report.

Essential Oils.		£	s.	d.
Anise	c.i.f. 1/10 spot	0	2	0
Bay		0	12	0
Bergamot		0	12	0
Cajaput		0	3	9
Camphor, white	per cwt.	4	0	0
Brown	„	3	15	0
Cassia	c.i.f. 7/9 spot	0	8	3
Cedarwood		0	1	6
Citronella (Ceylon)		0	3	2
(Java)		0	4	0
Clove		0	7	6
Eucalyptus		0	1	6
Geranium Bourbon		1	8	0
Lavender		0	12	6
Lavender spike		0	3	0
Lemon		0	3	0
Lemongrass	per oz.	0	0	2¾
Lime (distilled)		0	3	3
Orange sweet (Sicilian)	firmer	0	11	0
(West Indian)		0	9	6
Palmarosa		0	17	6
Peppermint (American)		0	13	0
Mint (dementholised Japanese)		0	6	3
Patchouli		1	12	0
Otto of Rose	per oz.	1	4	0
Rosemary		0	1	8
Sandalwood		1	6	0
Sassafras		0	5	0
Thyme	according to quality 2/6 to	0	8	0

Synthetics.			
Benzyl acetate	0	3	0
Benzoate	0	3	0
Citral	0	10	0
Coumarine	0	15	0
Heliotropine	0	7	0
Ionone	1	5	0
Lianlyl acetate	1	2	6
Methyl salicylate	0	2	6
Musk xylol	0	9	0
Terpeniol	0	3	1

Chile Nitrate Cable

The latest cabled reports of the Anglo-South American Bank, Ltd., from Valpariso, dated April 12, states that exchange has shown a favourable tendency during the past week, notwithstanding the small sales of nitrate during the period. The present quotation is 37.20 as compared with 37.60 a week ago, the sterling quotation being 6 7/16 d. per peso, or a rise of 1/16 d. on the week. The share market has been dull.

At the meeting of nitrate producers held here on the 4th inst., it was decided to make no alteration in the statutes, and the fixing of prices for the new year will consequently not be proceeded with before next month, the present statutes providing that such fixation shall take place in May or June of each year.

Since the date of the last cable sales of nitrate have been on a small scale, amounting to under 4,000 tons, the actual figure being 39,624 metric quintals. This compares with 160,000 metric quintals in the preceding week and with a weekly average of well over 400,000 metric quintals since May last, when sales were resumed, the aggregate amount of sales since the latter date being 19,769,000 metric quintals. The amounts fixed for various delivery dates are as follows :—

1922.	Metric Quintals.	1923.	Metric Quintals.
July	2,407,605	January	1,975,684
August	1,639,599	February	2,704,790
September	1,810,537	March	2,051,601
October	1,990,768	April	804,164
November	1,618,090	May	nil
December	108,172	June	2,657,992

Magadi Soda Company's Affairs

In view of the reported financial difficulties of the Magadi Soda Company and the appointment of a receiver on March 2 last, efforts are now being made to form a committee of shareholders to examine the position of the company and to ascertain the precise causes which have brought about the collapse.

An appeal to shareholders to support this proposal has been prepared by Messrs. E. P. Ainsworth, Harrogate; E. Harlow, Nottingham; A. P. Pennell and H. J. Stephens, London; and posted to those known to hold 500 shares or more. The circular states that there are over 8,000 shareholders in the company, and all are invited to join in the movement, the assistance of debenture holders also being solicited as their concurrence will be necessary in any schemes of reconstruction. Shareholders are invited to sign a form enclosed with the circular, to be returned to Mr. H. J. Stephens, 7, Union Court, Old Broad Street, E.C., if they are in favour of the formation of the committee.

A postcript adds that the Chairman of the company has written to Mr. Pennell stating that he has no objection at all to the proposed committee of inspection.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, April 18, 1923.

A QUIET tone continues to be maintained in the heavy chemical market, but while there is little demand for home consumption export inquiries have been fairly numerous.

Spot parcels of German products are becoming very scarce, although shipments continue to be received.

There is no important change in price to record.

Industrial Chemicals

ACID ACETIC.—Glacial, 98/100%, £64 to £69 per ton; 80% pure, £47 to £48 per ton; 80% technical, £45 to £47 per ton; c.i.f. U.K.

ACID BORACIC.—Crystal or granulated, £55 per ton; powdered, £57 per ton; carriage paid U.K.

ACID CARBOLIC.—Unchanged at 1s. 8d. per lb.

ACID FORMIC 80%.—Inclined to be scarce. Now quoted £55 to £56 per ton.

ACID HYDROCHLORIC.—Unchanged at 6s. 6d. per carboy, ex works.

ACID NITRIC 84°.—£27 10s. per ton, ex station, full truck loads.

ACID OXALIC.—Moderate inquiry, quoted 6¾d. per lb., ex store.

ACID SULPHURIC.—144°, £3 15s. per ton; 168°, £7 per ton; ex works, full loads. De-arsenicated quality £1 per ton additional.

ACID TARTARIC.—Unchanged at about 1s. 2¼d. per lb.

ALUM, LUMP POTASH.—Price for Continental material about £12 10s. per ton.

AMMONIA, ANHYDROUS.—Unchanged at 1s. 6d. per lb., ex station.

AMMONIA, CARBONATE.—Lump, 4d. per lb.; ground, 4¼d. per lb. delivered.

AMMONIA, LIQUID 880°.—About 3¼d. per lb. delivered.

AMMONIA, MURIATE.—Grey galvanisers quality, £31 to £32 per ton, f.o.r. works.

AMMONIA, SULPHATE.—25¼%, £15 10s. per ton; 25¾% neutral, £16 13s. per ton, ex works. April-May.

ARSENIC, WHITE POWDERED.—Unchanged at about £76 per ton, ex store, spot delivery.

BARIUM CHLORIDE 98/100%.—Quoted £18 10s. per ton, ex store.

BARYTES, FINEST WHITE ENGLISH.—£5 5s. per ton, ex works.

BLEACHING POWDER.—£11 10s. per ton, ex station, spot delivery. Contracts, 20s. per ton less.

BORAX.—Crystal or granulated, £28 per ton; powdered, £29 per ton, carriage paid U.K.

CALCIUM CHLORIDE.—English material, £5 15s. per ton, ex quay or station.

COPPER SULPHATE.—Quoted £26 10s. per ton, f.o.b. U.K.

COPPERAS, GREEN.—Moderate inquiry. About £2 15s. to £3 per ton, f.o.b. U.K.

FORMALDEHYDE 40%.—Unchanged at about £88 per ton, ex wharf.

GLAUBER SALTS.—Fine white crystals offered at £3 17s. 6d. per ton, ex store.

LEAD, RED.—English make, £43 per ton, carriage paid U.K. Continental about £36 10s. per ton, ex store.

LEAD ACETATE.—White crystals, £39 10s. to £40 per ton. Moderate inquiry for export.

MAGNESITE, GROUND CALCINED.—Unchanged at £8 10s. per ton, ex station.

MAGNESIUM CHLORIDE.—Spot lots about £5 per ton, ex store. Offered from Continent at £3 7s. 6d. per ton, c.i.f. U.K. prompt.

MAGNESIUM SULPHATE (Epsom Salts).—Commercial crystals, £7 per ton; B.P. crystals, £8 10s. per ton, delivered. Commercial offered at £2 per ton, f.o.b. Hamburg for British Colonies.

POTASH, CAUSTIC 88/92%.—Spot lots hard to obtain. Quoted £35 per ton, ex store.

POTASSIUM BICHROMATE.—Unchanged at 5¼d. per lb., delivered.

POTASSIUM CARBONATE.—96/98% about £33 per ton; 90/92%, £29 per ton, ex store, spot delivery.

POTASSIUM CHLORATE.—In little demand, crystal or powder, 3d. per lb., ex store.

POTASSIUM MURIATE.—Quoted £9 per ton, basis 80%, f.o.r. works.

POTASSIUM NITRATE (Saltpetre).—Unchanged at about £32 per ton, ex store.

POTASSIUM PERMANGANATE.—B.P. Price advanced to 11d. per lb.

POTASSIUM PRUSSIATE (YELLOW).—Inclined to be higher at 1s. 5¼d. per lb.

POTASSIUM SULPHATE.—Quoted £7 5s. per ton, basis 80%, f.o.r. works.

SODA, CAUSTIC.—76/77%, £21 10s. per ton; 70/72%, £20 per ton; 60/62%, broken, £21 5s. per ton; 98/99% powdered, £24 17s. 6d. per ton, ex station, spot delivery.

SODIUM ACETATE.—Small parcels on offer at £25 per ton, ex store.

SODIUM BICARBONATE.—Refined recrystallised, £10 10s. per ton, ex quay or station. Mineral water quality, £1 10s. per ton less.

SODIUM BICHROMATE.—Unchanged at 4½d. per lb. delivered.

SODIUM CARBONATE.—Soda crystals, £5 to £5 5s. per ton, ex quay or station; alkali 58%, £8 17s. 6d. per ton, ex quay or station.

SODIUM CHLORATE.—Price about 3d. per lb., ex store. Offered from Continent at 2¾d. per lb., c.i.f. U.K.

SODIUM HYPOSULPHITE.—Commercial quality, £10 10s. per ton; pea crystals, £15 10s. per ton, ex station. Commercial crystals offered from Continent at £9 15s. per ton, c.i.f. U.K.

SODIUM NITRATE, 96/98%.—Refined quality unchanged at £13 10s. per ton, f.o.r. or f.o.b. U.K.

SODIUM NITRITE, 100%.—£27 to £29 per ton, according to quantity.

SODIUM PRUSSIATE (YELLOW).—Now quoted 8¾d. per lb.

SODIUM SULPHATE (SALTCAKE 95%.)—Price for home consumption, £4 per ton, carriage paid station, on contract.

SODIUM SULPHIDE, 60/62% CONC.—British material offered at £15 15s. per ton, f.o.b. U.K. Continental, about £15 10s. per ton, c.i.f.

SULPHUR.—Flowers, £10 per ton; roll, £9 per ton; rock, £8 per ton; ground, £8 per ton. Prices nominal.

TIN CRYSTALS.—Unchanged at 1s. 2d. per lb.

ZINC CHLORIDE, 98%.—Solid English material, £25 per ton, f.o.b. U.K. port.

ZINC SULPHATE.—Quoted £14 10s. per ton, ex station.

NOTE.—The above prices are for bulk business and are not to be taken as applicable to small parcels.

Coal Tar Intermediates and Wood Distillation Products

ANTHRAQUINONE.—Good export demand. Price 2s. 8d. per lb., f.o.b.

BENZOIC ACID, TECHNICAL.—Home demand. Price quoted 2s. 3d. per lb., delivered.

BETA NAPHTHOL.—Some small inquiries. Price 1s. 2d. per lb., carriage paid.

DIMETHYLANILINE.—Small home inquiry. Price quoted 3s. 1d. per lb., delivered, returnable drums.

DIETHYLANILINE.—Small export inquiry. Price quoted 4s. 10d. per lb., f.o.b., drums included.

DIPHENYLAMINE.—Export inquiry. Price 3s. 6d. per lb., f.o.b.

ORTHO CRESOTINIC ACID.—Some demand from abroad. Price quoted 3s. 9d. per lb., f.o.b.

ORTHOAMIDOPHENYL PARA SULPHONIC ACID.—Export inquiry. Price 3s. per lb., f.o.b.

ORTHO NITROTOLUOL.—Home inquiry. Price 4d. per lb., delivered.

PARANITRANILINE.—Fair home demand. Price quoted 2s. 7d. per lb., delivered.

PARA NITRO ACETANILIDE.—Home inquiries. Price 3s. 11d. per lb., delivered.

PARA AMIDO ACETANILIDE.—Home inquiry. Price 5s. 4d. per lb., 100% basis, delivered.

PICRIC ACID.—Small inquiries. Price 1s. 6d. per lb.

"R.R." ACID.—Home inquiries. Price 17s. 6d. per lb., 100% basis, carriage paid.

"R" SALT.—In fair demand. Price 3s. 3d. per lb., 100% basis, carriage paid.

SULPHANILIC ACID.—Small home inquiry. Price quoted 1s. 6d. per lb., 100% basis, carriage paid.

SCHAEFFER SALT.—Small home inquiry. Price quoted 5s. per lb., 100% basis.

Manchester Chemical Market

[FROM OUR OWN CORRESPONDENT.]

Manchester, April 19, 1923.

THERE has been a comparatively healthy tone about the chemical market here during the past week. Buying has been going on steadily by home users, even though the quantities have been relatively small, while export business also has been fairly active. Prices all round are very firm indeed, and in several cases where supplies are light a tendency towards higher levels is to be observed. A prominent feature of Stock Exchange business here continues to be the strong support given to "chemicals."

Heavy Chemicals

Caustic soda keeps firm at from £19 per ton for 60 per cent. to £21 10s. for 76-77 per cent. strength, sellers meeting with a steady demand for home and export. Bleaching powder also is very steady at £11 10s. per ton to home users, who are taking good quantities; the demand for shipment is maintained at the level of recent weeks. Soda crystals are still rather inactive at £5 5s. per ton delivered. Saltcake is steady at £4 10s. to home consumers and round £5 per ton for shipment, a good home and export inquiry being reported. Sodium sulphide, 60 to 65 per cent. concentrated, is quiet at £15 per ton, crystals being on offer at £9 to £9.10s. Glauber salts are only moderately active at £4 per ton. Bicarbonate of soda is firm and in steady inquiry at £10 10s. per ton delivered to home users. Both home and foreign buyers of alkali are still taking good supplies, home trade prices being firm at £7 12s. 6d. per ton for 58 per cent. material and a little more for shipment. Hyposulphite of soda is quiet but unchanged at £15 per ton for photographic crystals and £10 for commercial. Nitrite of soda also is inactive, though prices are firm at £26 10s. per ton. Phosphate of soda is still quoted at £15 per ton but there has been little improvement in the demand. Chlorate of soda is in steady inquiry at 3d. per lb. Prussiate of soda is quiet and rather weaker at 8½d. per lb. Bichromate of soda is firm and in moderate demand at 4½d. per lb. Acetate of soda is still scarce at about £25 per ton.

Caustic potash is again firmer at £34 10s. per ton for 88-90 per cent., supplies being readily taken up. Carbonate of potash is steady and in good demand at £32 10s. per ton for 96-98 per cent. material. Bichromate of potash is firm and in fair inquiry at 5¾d. per lb. Yellow prussiate of potash is only in moderate request, though prices are steady at round 1s. 5½d. per lb. Chlorate of potash is still fairly active at 3¾d. per lb. Permanganate of potash is dearer at 10¼d. per lb.

Export business in sulphate of copper is said to have improved a little, though the home demand is still quiet; prices are about unchanged at £26 to £26 10s. per ton. Arsenic keeps very firm at £75 per ton for white powdered Cornish makes, supplies continuing short with a steady foreign inquiry. Commercial Epsom salts keep quiet at about £6 10s. for British makes; magnesium sulphate, B.P., is unchanged at £7. Acetate of lime is scarce and firm at £20 for grey and £10 10s. per ton for brown. Nitrate of lead is quiet but steady at £43 10s. per ton. White sugar of lead is in steady demand at about £40 per ton, brown being quoted at round the same figure, though supplies are very small.

Acids and Tar Products

Tartaric acid is in improved inquiry at 1s. 2¼d. to 1s. 3d per lb. Citric acid, B.P. crystals, is also selling better, and prices are firm at 1s. 8d. per lb. Acetic acid is steady and in good demand at £70 per ton for glacial and £47 for 80 per cent. technical. Oxalic acid is quiet but unchanged at 6½d. to 6¾d. per lb.

Pitch is still scarce though the demand is less pressing, the price now being £9 to £9 10s. per ton, f.o.b. Manchester. Carbolic acid crystals are still a good section at 1s. 8d. per lb., crude, 60 per cent., being very firm at 4s. to 4s. 3d. per gallon. Benzole is rather quiet at 1s. 8d. per gallon. Solvent naphtha is also inactive at about the same price. Creosote oil is a shade quieter at 10¼d. to 10½d. per gallon. Naphthalenes are in better demand; refined is unchanged from last week at £19 to £20 per ton, with crude firmer at £6 to £13, according to grade.

Aikman's Nitrate Report

IN their fortnightly circular Aikman (London) Ltd., state that the tone of the nitrate market has been quiet during the fortnight and Continental dealers have been fully occupied in taking delivery of old purchases. Fresh business has been confined to the sale of a few near steamer parcels at £12 7s. 6d. c.i.f., which remains about the value at the close. Deliveries have been on a large scale and amount to 102,000 tons for the first half of April, against 75,000 tons last year, with stocks at 15th inst. 153,000 tons and afloat 151,000 tons, against 411,000 and 39,000 tons respectively at the same date last year. The feature has been the active buying by Continental dealers of next spring delivery at prices varying from £12 10s. to £13 5s. per ton, according to market. The quantities already contracted for are believed to be greatly in excess of the usual purchases at such an early date, and indicate a growing confidence that at the level of price now ruling a further expansion in consumption may be looked for.

The Producers' Association have only sold 10,000 tons during the fortnight for April delivery, making their total sales for shipment after July 1, 1922, 1,955,000 tons (of which 1,695,000 tons for shipment up to April, 1923). At the special meeting held in Valparaiso on the 4th inst., the proposal to alter the statutes of the Association so as to permit the immediate fixing of forward prices was rejected, and prices will in consequence not be fixed until early May. The reason for this delay is understood to be the desire to announce a renewal of the association simultaneously with the fixing of prices. As purchases for the current season have now been practically completed it is unlikely that any further important sales will be made by the association until the new prices are announced. A fair quantity of f.o.b. for June shipment has changed hands on resale at 19s. 5d. to 19s. 6d. per metric quintal, as compared with the last association price of 19s. 1d., and large sales may be expected as soon as the new scale of prices is given out. It is understood that a majority of the coast producers are in favour of the scale of prices (19s. 6d. to 21s. per metric quintal) recommended by the English companies, although a certain section have expressed the opinion that higher prices are justified owing to the improved position of the industry.

Catalogues Received

MANLOVE ALLIOTT AND CO., LTD.—An illustrated catalogue dealing with Hydro-Extractors and Centrifugals, has been received from the above firm. Particulars are given of the various sizes and types for steam or electric drive both under-driven and top-driven. Accessories for these machines are also included. The catalogue will be supplied on application to the Publicity Department, Bloomsgrove Works, Nottingham, on quoting the number of the catalogue—512.

H. K. LEWIS AND CO., LTD.—We have received from the above-named publishers copies of two monthly lists (February and March) of books on scientific and medical subjects recently added to their circulating library. It may be pointed out that this library covers scientific and technical books, and that the latest books on research and technical processes are continually being added, while the industrial scientific worker can keep in touch with the latest publications through these monthly lists. The address is 136, Gower Street, London, W.C.1.

ROSE DOWNS AND THOMPSON, LTD.—An elaborate catalogue of some 200 pages is issued by the above-named company from their head office, Old Foundry, Hull, which contains full particulars and illustrations of their various types of crushers, pumps, filters and accessories for oil-seed crushing and the extraction of the oils. Descriptions of the various methods of working are given and full diagrams of some examples of their machinery are also given. A speciality is made of machinery for export to the Far East, the company having a branch in Shanghai.

Company News

BROKEN HILL SOUTH.—A dividend is announced at the rate of 1s. 6d. per share, payable on May 25.

ANGELA NITRATE CO.—The directors recommend a final dividend of 5 per cent., making 10 per cent. for the year, against 15 per cent. for the previous year.

THE ESPERANZA COPPER AND SULPHUR CO., LTD.—The transfer books were closed on April 20, and will remain closed until May 12, for the preparation of new share certificates.

THE INTERNATIONAL NICKEL CO.—A quarterly dividend of 1½ per cent. on the preferred stock has been declared, payable on May 1, to the preferred stockholders of record at the close of business on April 16.

THARSIS SULPHUR AND COPPER CO.—The annual general meeting was held on Wednesday, April 18, when a dividend of 5s. per share, equal to 12½ per cent. on the capital of the company, was declared for the year 1922.

THE ASSOCIATED PORTLAND CEMENT MANUFACTURERS, LTD.—The transfer books and register of members of the 5 per cent. second debenture stock are closed until May 2, for the preparation of half-yearly interest warrants.

MANGANESE BRONZE AND BRASS CO.—The report for 1922 shows a balance, including £17,986 brought in, of £21,887. After providing for the preference dividend there remains £11,762, which the directors propose to carry forward.

RECKITT AND SONS, LTD.—A distribution of £55,000 in connection with their profit-sharing scheme took place at Hull during last week-end. The firm have nearly 7,000 employees throughout the world, and the allocation of profits works out this time at 5 per cent. on wages earned.

SWEDISH MATCH CO.—The report for 1922 shows a net profit for the year of 9,019,751 kroner, and 1,408,344 kroner was brought in, making a total of 10,428,095 kroner. A dividend of 12 per cent. is recommended, the same as for the previous year, carrying forward 5,028,095 kroner.

MASON AND BARRY, LTD.—A dividend for the year ended December 31, 1922, at the rate of 37½ per cent., less income tax, was declared at the ordinary general meeting held on April 16, payable on and after Thursday, April 26, at the office of the company, 87, Cannon Street, London.

BABCOCK AND WILCOX, LTD.—The directors announce a dividend of 9 per cent. for the past half-year, together with a bonus of 3 per cent., both free of tax, making, with the interim dividend, 20 per cent. for the year. For each of the two preceding years the distribution was 16 per cent. The share transfer books are closed until May 2.

SAN PATRICIO NITRATE CO.—The report for 1922 shows a loss, after providing for administration charges and income tax, of £1,348 (against a profit of £2,569 for 1921). This sum has been carried to the debit of the profit and loss account, leaving a credit on that account of £8,082. A dividend of 6d. per share, free of tax, is proposed, which will absorb a sum of £2,500.

WRIGHT, LAYMAN AND UMNEY.—The accounts for 1922 show that after providing for staff bonus, bad debts, depreciations, etc., there is a trading profit, including income from investments, of £34,513, which, with the sum of £10,520 brought forward, makes a total of £45,033. After paying a dividend of 6 per cent. on the preference shares, interim dividends of 12½ per cent. on the ordinary shares and £4,400 for directors' fees, the directors recommend a further dividend of 12½ per cent. on the ordinary shares, making 25 per cent. for the year, and a bonus of 3s. per share on the ordinary shares, transferring £8,000 to reserve, leaving £8,806 to be carried forward.

JOSEPH NATHAN AND CO.—The profit for the year ended September 30, 1922, was £20,763 (against £82,447 in the previous year); which, with £86,075 brought in, makes an available balance of £106,838. The directors do not propose to recommend the declaration of any final dividends. After the payment of various interim dividends, calling for £58,551, the directors recommend that the balance of £48,287 be carried forward. The report states that although the company's total turnover has been more than maintained, the ratio of profit has been seriously affected by the exceptional conditions ruling. During the year under review the directors have made changes in the general operations of the company. Non-profitable departments have been closed and certain special stocks liquidated. The losses arising out of this reorganisation and liquidation have been provided for out of reserves. Depreciation of machinery, plant and fittings, and estimated liability for income tax, both British and colonial, corporation profits tax, and land tax have been provided for in the year's trading accounts. The annual meeting will be held at Glaxo House, 56, Osnaburgh Street, London, N.W., on April 30, at 12 o'clock noon.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIAL.	REF. NO.
Italy	Anhydrous sulphate of soda ..	510
New Orleans ..	Fertilising materials, palm oil, etc.	524
Buenos Aires	Centrifugal pumps.....	D.O.T. 7857/ F.L./E.C./2
Colombia	Paints and varnishes	527

"Chemical Age" Inquiry List

The following inquiry has been received from a reader of "The Chemical Age." Replies addressed to the box number given below, c/o "The Chemical Age," 8, Bouverie Street, London, E.C.4, will be forwarded to the inquirer.

Manufacturers of acetic acid 80% technical pure and acetic acid glacial 99/100%.—No. H.22.

Tariff Changes

PORTUGAL.—A new tariff has been introduced, as from April 20, including import duties of all classes of chemical products. Full particulars were given in *The Board of Trade Journal* of April 12.

TUNIS.—The import duties on chemical products derived from coal tar have been altered by a "co-efficient of increase" fixed at 3.

Contracts Open

Tenders are invited for the following articles. The latest dates for receiving tenders are, when available, given in parentheses:

BUCAREST.—Sulphate of copper. Particulars from the Department of Overseas Trade, 35, Old Queen Street, London, S.W.1.

SWINDON (April 28).—Oils, paints, disinfectants, chemicals. Particulars from S. C. Bagott, 34, Regent Circus, Swindon.

Laboratory Table Tops

UNDER the auspices of the Industrial Division of the American Chemical Society, Mr. C. R. Hoover has carried out a number of experiments designed to reproduce conditions met in laboratory work with hard and soft woods, finished with acid-proof stains, oils and varnishes applied in different ways, and with the following materials:—"Alberene," "Asbestos Wood," "Bakelite," chemical stoneware, "Ebony Wood," enamelled iron, glass, lead, linoleum, marble, "Marbeloid," rubber flooring, hard rubber, slate, tile (glazed and unglazed).

Materials were tested in some or all of the following ways:—resistance to chemical corrosion, mechanical abrasion and heat; effect of heat shock; conductivity of heat; breakage of glass-ware; re-surfacing. Relative costs of installation had been estimated and the materials used in a number of new laboratories tabulated.

The results of the investigation confirm in large measure the popularity of certain materials, but indicate that in addition to these a few products recently brought on the market can be profitably utilised for general or special purposes.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Company Winding Up

THE LANCASHIRE PHOSPHATES, LTD. (C.W.U., 21/4/23.) Meetings of creditors, April 27, 10.30 a.m., and contributories, April 27, 10.45 a.m., Official Receiver's Offices, 13, Winckley Street, Preston.

Companies Winding Up Voluntarily

SACOL CHEMICAL CO., LTD. (C.W.U.V., 21/4/23.) A. D. Watson, Bankside, Hull, company secretary, appointed liquidator.

ZAPIGA NITRATE CO., LTD. (C.W.U.V., 21/4/23.) W. J. Welch, 27, Leadenhall Street, E.C.3, appointed liquidator. Meeting of creditors at 27, Leadenhall Street, London, E.C.3, on Monday April 23, at 12 noon.

Notices of Dividends

HAMLEY, John H., and TURLE, Douglas (carrying on business in co-partnership as COMPAGNIE JUVENILEAU), 97, Cannon Street, London, perfume merchants. Supplemental dividend of 2d. per £. Payable any day (except Saturday) between the hours of 11 a.m. and 2 p.m., Bankruptcy Buildings, Carey Street, London, W.C.2.

ROBINSON, Cuthbert Lawrence, Phœnix Works, Middleton, and at 14, Ridgefield, Manchester, under the style of THE BOARSHAW BLEACHING CO., bleacher. First and final dividend of 3d. per £. Payable April 19, 15, Cooper Street, Manchester.

Partnership Dissolved

HEALEY, ROYLE AND CO. (Reginald John HEALEY and Philip Oliphant ROYLE), wholesale manufacturing chemists, Wells Road, Shepherd's Bush, London W.12, by mutual consent as from December 31, 1922. Debts received and paid by R. J. Healey.

New Companies Registered

ASTORIA FILMS, LTD., 28, Bishopsgate, London, dealers in celluloid, cellulose, gelatine, etc. Nominal capital, £500 in £1 shares.

BOYNE SYNDICATE, LTD., manufacturing and research chemists, manufacturers of and dealers in chemical, industrial and other preparations. Nominal capital, £100 in £1 shares. A director: L. W. Stanley, 4, Brondesbury Road, N.W.

CLARE, MACNEARY AND CLARE, LTD., 45, Dutton Street, Manchester. Importers and exporters of and dealers in chemicals, colours, oils, paints, drugs, etc. Nominal capital, £1,000 in £1 shares.

DORSLO, LTD., 41, North John Street, Liverpool. Manufacturers of and dealers in household, toilet and other soaps, etc. Nominal capital, £1,000 in £1 shares.

MAGUIRE AND PATERSON (BELFAST), LTD., Donegal Place, Belfast. Match manufacturers. Nominal capital, £150,000 in £1 shares (50,000 cumulative participating preference and 100,000 ordinary).

NORTHERN PRODUCTS, LTD., 9–10, George Yard, Lombard Street, London, E.C.3. Manufacturers of and dealers in polishes, pastes, oils, drugs, soaps, chemicals, etc. Nominal capital, £500 in £1 shares.

PRICE'S SOAP CO., LTD., Lever House, Blackfriars, London, E.C.4. Soapmakers, varnish makers, manufacturers of and dealers in tallow, oil, glycerine, chemicals, paints, dyes, colours, etc. Nominal capital, £1,000 in £1 shares,

Lever Brothers, Ltd.

SPEAKING at the annual general meeting of the shareholders on Thursday, April 12, of Lever Brothers, Ltd., Lord Leverhulme said that in the accounts presented they had to deal with the losses that were made by certain of their companies, the most serious being those of the companies in West Africa and of their margarine company. These losses had for the two previous years been dealt with by the directors, in their valuation, placing no value on the shares of these companies. The West African resources were their source of supply of oils and fats both for soap and margarine, but the exhorbitant local freight and export duty kept the price at a very high level compared with pre-war costs. The position was rather more hopeful than it had been for some of these undertakings and a new valuation of their assets had been made which was incorporated in the report.

Referring to the Whitley Report, he said that in his opinion its recommendation of workmen's committees to take part in the control of industry had been the most harmful suggestion ever made, and one that had created very largely the spirit of unrest now prevailing. It was no more practicable in a manufacturing business than it would be on a ship navigating the ocean. He did not want it to be thought that he was unsympathetic with advancement and progress for labour, however.

With reference to taxation, he said he believed that any relief that could be given to the heavy burden of taxation borne by the citizens of the United Kingdom would have an immediate direct effect in improving business, increasing demand and reducing unemployment. Considering the present state of taxation and other handicaps he thought the prospects of the company were good.

Chemical Trader's Bankruptcy

AT the Bankruptcy Court on Friday, April 13, the affairs of James Mill and David Lyell Mill (trading as Davidson and Lyell), 35, Finsbury Square, E.C., carrying on business as export merchants in textiles, oils and chemicals, came before Mr. Registrar Francke, on the hearing of their application for an order of discharge. In the receiver's opinion the joint unsecured indebtedness amounted to £15,387 in respect of which proofs of debt by eight creditors had been lodged for sums amounting to £6,640. The dealers, who were father and son, carried on the business with success until September, 1920, when a slump in textiles began and their customers refused to accept delivery of goods with the result that they were left with a considerable stock on hand. They attributed their insolvency to their liability for goods ordered but not taken up, to the slump in trade and to bad debts. The Official Receiver opposed the application on the grounds that the debtor's assets were not of a value equal to 10s. in the £ on the amount of their unsecured liabilities: that they had omitted to keep proper books of accounts, and that they had continued to trade after knowing themselves to be insolvent. The discharge was suspended for two years.

Wood for Chemical Plant

ALL industrial chemists are familiar with the fact that wooden tanks are considerably less expensive to instal than tanks constructed of other materials. The present cost of open top wooden tanks compares very favourably with the approximate cost of steel tanks of similar capacities. Where the tanks are constructed of more expensive metals, such as copper, aluminium or lead, the margin of cost is still greater. But not all are aware of the equally important fact that for many chemicals, wooden tanks are much superior to iron or steel, and indeed to other more resistant metals. Furthermore, in many cases the frequent shut-down and repairs due to corrosion of iron and steel pipes may be nearly entirely avoided by the use of pipes constructed of wood. An investigation has been made by Mr. C. S. Robinson, of the American Chemical Society, into the suitability of various kinds of woods for chemical purposes. It is understood that this will be available shortly.

A New Non-Poisonous Paint

A REPRESENTATIVE of the manufacturing firm of Pinchin, Johnson and Co., Ltd., stated recently that with or without prohibitory regulations the use of lead paint would probably decline, owing to the discovery of a non-poisonous paint of superior qualities. In the non-poisonous paints, he said, the pigment had no effect on the oil, and they would therefore last the "life" of oil—five years. In lead paints, after exposure to the weather for three years, disintegration took place owing to the oxygen-absorbing properties of the lead, and the paint film could be scraped off in a powder. By the substitution of a certain other mineral for the lead, the nature of which was not disclosed, it was claimed that this defect was eliminated.